COMPUTERWORLD

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NEWSPAPER

Singer Ten Users Hope for the Best

By Nancy French
Of the CW Staff

COLUMBUS, Ohio "Prepared for the worst, but hoping for the best," the Singer Business Systems users group last week presented a statement to TRW, Inc., caretaker of Singer's user base, touting the features of the System Ten and urging TRW to continue producing it.

The statement was formulated a week earlier at a Forum meeting in Chicago, which was attended by some 240 users, according to the group's president, Carlton Mathews, DP manager for Restaurant Food Supply Co., here.

Singer Business Systems users who believe many features of their systems "cannot be replaced by anything else presently on the market" are concerned that TRW will not continue manufacturing the business system after Singer's five-year commitment to supply parts for installed systems runs out.

To date, TRW has committed itself only to software support and hardware maintenance.

Although a TRW spokesman refused to comment on the company's plans until the firm has had time to review the situation in greater depth, some believe the System Ten could enhance TRW's product line a point in the user's favor.

"To my knowledge, TRW has no computer of its own. The point-of-sale (POS) system it installed at the May Co. is supported by Data General Corp. Nova computers, and elsewhere Cincinnati Milicron systems are being used," Mathews explained.

"Users are at a decision point," the statement said. "We each have a considerable investment in hardware and software and prefer to continue

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IBM Called 'Strikebreaker' in County Dispute

By E. Drake Lundell Jr.
Of the CW Staff

GOSHEN, N.Y. – IBM employees are acting as "strikebreakers" in a dispute here between county employees and the Orange County government, sources close to the striking employees said here last week.

At present almost 1,000 county employees are striking the county after "step" wage increases mandated by a county contract with the Civil Service Employees Association (CSEA) were cut drastically by the state.

Those strikers include 18 out of the 19 normal employees of the county data processing operations, leaving only the manager still working.

However, last Tuesday DP Manager Lewis Allard got help putting out the payroll from William Shea, a marketing representative, and Gordon Brown, a service engineer, both from IBM's Fox St. office in Poughkeepsie near here, according to the strikers.

Members of the Orange County Chapter of the statewide CSEA immediately termed the action a strikebreaking maneuver on the part of nonunionized IBM and threw up a picket line around the firm's Poughkeepsie operation.

A Different View

However, employees still working for the county took a different view, with Dave Smith, executive assistant to the county executive indicating he would "refuse to characterize [the help] as strikebreaking."

At the same time, Smith noted that employees of unionized firms had been honoring the picket lines of the county employees and refusing to service the county government.

Allard refused to talk to the press last week and the two IBM employees involved were "out of the office" late last week.

Smith said the county had been using an IBM 370/125 since January of 1975 and that IBM sales representatives and technical advisors had been on call during the conversion phase as the county switched over from NCR equipment to the IBM system.

"They have been here on numerous occasions," he said last week, saying they had been on the premises during the strike, helping the manager get the payroll out for the nonstriking employees of the county.

At the same time, Smith said "it could be true" that the manager would not have been able to complete the work he did without the help of the IBMers.

The basic dispute revolves around step increases that were promised to county employees through a contract negotiated last fall.

The increases depended on grade, but would have ranged from $400 to $1,000 per year for the employees, according to county and union sources.

The contract also called for a negotiated cost-of-living escala-

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New AT&T Line Rates Hike Users' Bills $70,000/Mo

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – AT&T increases in low-speed line rates which took effect last week will cost some data network users as much as $70,000/mo more in phone bills.

The increases were levied by AT&T on users of its Series 1000 low-speed service which includes 1,100 users of the interstate private line service, according to a Bell spokesman.

Among the hardest hit group are finance companies including Household Finance, Beneficial Finance and Dial Finance. One source estimated they will have to pay $3 million more per year.

Also affected is the Holiday Inn reservation network operated by a subsidiary called General Data Corp. and Control Data Corp.'s Service Bureau Co.

Many of these and much smaller users designed networks at low "telegraph" speeds because this was previously considered a low-cost conservative approach using standard Bell System offerings.

The equipment used by the larger network users is mostly IBM 1980-type or IBM 2970-type teleprinters which operate at low speeds.

To upgrade this equipment for higher speed Bell services, the users would be faced with high conversion costs in addition to the higher line charges.

One large finance company spokesman said that when its network was first being planned, AT&T sent a marketing vice-president to discuss the proposed details, "but when they told us about this increase, a clerk called from the local telephone company office."

(Continued on Page 4)

Jung Claims Justification For Criticism of SSA Plan

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. A computer programmer who works within the Social Security Administration (SSA) and has criticized that agency extensively for its plans to build a $69 million computer center and a $2.3 million temporary facility "it doesn't need" has received word from two government agencies indicating they have or know of software capability that would permit the SSA to get rid of one phase of its computing operation.

In particular, the Central Intelligence Agency (CIA) "has a package which simulates the Univac 70/35 emulating an RCA 301," Ferdinand Jung has learned.

With that package to run RCA programs on an IBM 360 and with information from the Pentagon that the capability exists to mix OS and DOS jobs on an IBM OS machine, Jung said, the SSA should be able to dispense with its medium-scale operations.

For Jung the information from these agencies confirmed what he has contended all along that "present capacity more efficiently utilized is more than adequate to handle all of the SSA's computer requirements" [CW, Jan. 26].

But "no official contact has been made with SSA by either the CIA or the Pentagon," according to Harry Overs, acting director of the SSA's Bureau of Data Processing.

"SSA has always been aware of simulation techniques and of the capability to run DOS under OS, but does not find most of these capabilities suitable to our needs," Overs said.

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Not for Certification

ACM Plans Trial Run for Self-Testing

By Catherine Arnst
Of the CW Staff

NEW YORK – The Association for Computing Machinery's (ACM) self-assessment procedure, which President Jean Sammet described as "one of the most exciting concepts that I have come across in many years" [CW, Oct. 22], will have a trial run in the May issue of *Communications of the ACM*.

The issue will contain a sample of 30 questions to test the knowledge of some programming skills and techniques. Answers and applicable references to the literature will be published with the questions.

The questions are part of a pilot study being conducted by the ACM Ad Hoc Committee on Self-Assessment, which is now investigating the value of such procedures.

The purpose of self-assessment is "self-education, not grading or certification," Sammet has said. The committee emphasized that "while testing and certification involve the measurement of a person's knowledge and capability by another person or group, self-assessment is an individual educational experience, intended to help a person to understand and extend his knowledge."

The differences between self-assessment and testing have been accentuated by calling the self-assessment package a "procedure" rather than a "test," the committee added.

The person answering the questions may follow any procedure desired, whether that means answering the questions and then referring to the answers or reading the answers and going back to the references.

"These approaches and others are all acceptable if, at the end of the procedure, the participant can say, 'This has been a worthwhile experience' or 'I

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DP-Generated Notice OK'd

Woman Dies After Utility Shuts Off Gas

By Catherine Arnst
Of the CW Staff

MUNHALL, Pa. – An 82-year-old woman froze to death here after the credit department of a gas company approved a computer-generated notice ordering her gas shut off.

The body of Sophia Easer, who was five months behind in her bill with the Equitable Gas Co., was found dead Jan. 19, two weeks after her gas was shut off.

When the body was found, a check made out to Equitable for $71.68 was found on the dining room table. Easer had apparently forgotten to mail it.

The Allegheny County Coronor's Office said the cause of death was freezing. Her death was believed to be the first of this type in the state.

During a coronor's inquest last month, Edward Fagan, assistant district attorney, tried to determine who, if anyone, was responsible for Easer's death.

While questioning John Innocenti, Equitable's credit manager, Fagan asked, "You mean the order for cutting off the gas came from the computer?"

"That's correct," Innocenti replied.

Not Exactly the Case

That was not exactly the case, company officials explained. Equitable handles its billing process on an IBM 370/135; all credit information is received from the credit department.

When a customer is behind in payments by a certain amount, that amount is automatically added to the next bill sent out. If the unpaid balance gets larger, an overdue notice is sent.

After the period of time a bill is allowed to be overdue has elapsed (a standard, set by the credit department, which is the same for all accounts), a shutoff notice is generated, the company said.

This shutoff notice, however, is not mailed directly to the customer from the DP center, according to Blair Chrise, Equitable's DP manager. It first must be checked and approved by the credit department.

The final decision is made by Innocenti, who bases his decision in part on an "unwritten policy" within the company that if the customer is elderly or disabled or if the temperature on that day is expected to drop below 20°, the gas is not shut off.

Innocenti claimed he had checked with the National Weather Service early Jan. 5, the day Easer's gas was shut off, and was told the temperature was expected to reach the mid-20s. The high for the day was actually 19° and the low 9°.

Knock Not Answered

Customarily, the meter reader has a meter-reading document which contains information on the customer such as age and health, Chrise said. In Easer's case, Equitable also had a key to enter the house so it could read the meter, but on Jan. 5 her door was double-locked.

The employee sent to turn off the gas (who was not the meter reader) was not aware of Easer's age. When he arrived he knocked on the door, but the woman was partially deaf, a fact of which the company was not aware, Innocenti said.

Easer was known as an eccentric, Innocenti said, adding she had fallen behind on her bill once before, but paid it when she received a shutoff notice.

Criminal charges were not brought against Equitable because a company cannot commit involuntary manslaughter; only an individual can be charged with that, Fagan said. Equitable could be sued for civil liability, he added.

The Allegheny County coroner, Cyril Wecht, placed responsibility for Easer's death with the Public Utility Commission (PUC) as well as Equitable for not having any established guidelines covering utility shutoffs.

The PUC has since placed a 90-day moratorium on all utility shutoffs in the state, including gas, electricity and telephone service while it tries to establish such guidelines.

Equitable is also reviewing all its procedures to ensure that this type of "tragic mistake" does not happen again, according to Donald Kellough, vice-president of the company.

One change that will probably be made is to add a "VIP code" to the master file in the computer data banks, Chrise said.

The data base currently contains all "pertinent information" on Equitable's 250,000 customers, such as name, meter number and address. The VIP code would add information on the customer's age and infirmities and the name of an interested third party that could be contacted if necessary, he explained.

FBI Picks Firm to Design Model Of Fingerprint-Matching System

BUFFALO, N.Y. – The Federal Bureau of Investigation (FBI) is one step closer to automated fingerprint matching as a result of a contract signed recently with Calspan Corp. here.

Calspan has been selected to fabricate a prototype model of a subsystem that can match a set of fingerprints against a data base of fingerprints to speed the process of identifying individuals.

This procedure is now done completely by the human eye and takes about 3,300 FBI fingerprint technicians and clerks to file, classify and match fingerprints forwarded by local and state police agencies.

The FBI's card file currently contains about 21 million fingerprint records; many are duplicates, and some are prints of people now dead, an FBI spokesman said.

The matching algorithm being used by Calspan was developed by the Commerce Department's National Bureau of Standards under FBI direction, a Calspan spokesman said.

The prototype matcher is expected to compare a set of submitted prints against prints on file at the rate of 100 print/sec. It will work by comparing the minutiae read by an automatic fingerprint reader and scoring the comparison.

The pairs of fingerprints receiving the highest score from the matcher will then be verified by humans to assure accuracy of the identification, the FBI said.

The matcher will be based on a Digital Equipment Corp. PDP-11/50 which has been integrated with special-purpose hardware designed by Calspan, the Calspan spokesman said.

Correction

Persons interested in attending the Western Electronic Manufacturers Association (Wema) spring conference in Monterey, Calif. April 21-23 [CW, March 8] should contact Wema at 2600 El Camino Real, Palo Alto, Calif. 94306.

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Please understand that this is no reflection on those salesmen themselves — all of whom are fine upstanding types. In fact, we respect them so much for what they're doing for us — at no cost whatsoever — that we'd like to start a nationwide campaign: "Take an IBM sort salesman out to lunch!"

The trouble — for them anyway — is that their sorts just can't compete with SyncSort III-and-half. And this fact is beginning to seep down into a few souls over there in Hardwareland.

If you don't believe it, try this simple little experiment. The next time your IBM rep appears, shake his hand and make him comfy. Then ask him, casually, if he'd be interested in testing his PEER ICEMAN package against our SyncSort III-and-half. You'll use your file characteristics, and you'll be the impartial arbiter of which does a sort job better.

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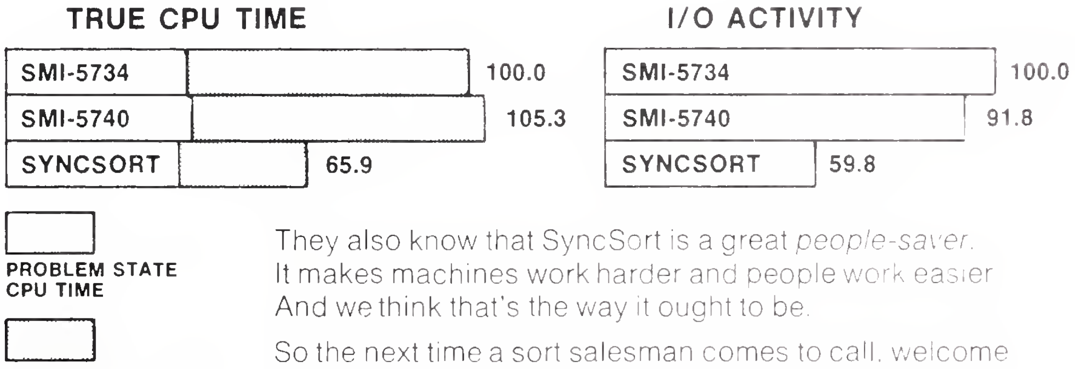

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High Court Vote Spurs Action on Tunney Privacy Bill

By Nancy French

Of the CW Staff

WASHINGTON, D.C. — Spurred by a Supreme Court ruling last week that denied the privacy rights of an individual who said his arrest record was used to stigmatize him, Sen. John V. Tunney (D-Calif.) told his staff members to get back to work on a bill that would prevent such abuses in the future.

The bill Tunney told staff members to dust off has been languishing for nearly a year before the Senate Judiciary Committee's Constitutional Rights Subcommittee, which he chairs.

Tunney said the Supreme Court decision, indicating privacy rights were not a federal matter, underscored the fact that a federal law is the only protection an individual will have against careless and unnecessary dissemination of criminal records.

Government officials said the case appears to have serious implications for the recent curbs suggested on use of computerized criminal records.

The Justice Department's agreement to postpone implementing a computerized switching system for use in transmitting arrest and conviction data nationwide could also be affected, officials agreed.

However, none would comment "on the record" by press time without a careful reading of the decision.

Disposition Unneeded

Robert Ellis Smith, editor of the *Privacy Journal*, said the high court was saying, in effect, that a raw arrest record without disposition does have validity and that police need not wait for a disposition to disseminate it.

He noted that existing federal law treats the matter of privacy and security of arrest records in an amendment to the Omnibus Crime Control Act.

The provision, which is contained in the portion of the law authorizing funds for the Law Enforcement Assistance Administration (LEAA), declares that federally assisted systems must protect privacy and security of such data "to the maximum extent feasible."

LEAA issued drafts of privacy and security regulations last May which are expected to be formalized after hearings early this year.

The Supreme Court ruling came on a suit brought by Edward D. Davis III of Louisville, Ky., who claimed he was publicly stigmatized by a circular police sent to 800 merchants during the 1972 Christmas season, listing him as an "active shoplifter."

Davis, a photographer for the *Louisville Courier Journal and Times*, had been arrested for shoplifting on June 14, 1971, but charges were dropped. However, at the time the circular was distributed, some 18 months later, no disposition had been entered into his file. Davis had no record of any convictions, according to his pretrial brief.

Davis learned of the circular from his employer who told him no action would be taken against him as a result of the arrest record, but warned him not to be caught in a similar situation again, the brief said.

Claimed Rights Violated

In his suit, Davis contended that the police had violated his constitutional right of privacy, his right to be presumed innocent until proven guilty and his right not to be labeled as a criminal without first having had an opportunity to be heard.

The court disposed of the case on jurisdictional grounds, explaining that privacy in itself was neither a civil nor a constitutional right, and defamation or loss of reputation was not a matter to be judged in federal court unless it was accompanied by injury such as loss of his job.

The vote was 5-3 with Justice William H. Rehnquist writing for the majority.

Justices William Brennan Jr., Thurgood Marshall and Byron White dissented.

Vote 5-3

In his dissent, Brennan said, "the court today holds that public officials, acting in their official capacities as law enforcers, may, on their own initiative and without trial, constitutionally condemn innocent individuals as criminals and thereby brand them with one of the most stigmatizing and debilitating labels in our society.

"If there are no constitutional constraints on such oppressive behavior, the safeguards constitutionally afforded an accused in a criminal trial will be rendered a sham, and no individual can feel secure that he will not be arbitrarily singled out" for punishment.

New Rates Hike Users' Bills $70,000/Mo

(Continued from Page 1)

Some industry sources see the AT&T increases as an attempt to drive users off the low-speed Series 1000 service into higher speed offerings, which Bell is emphasizing.

One large user said local Bell representatives had told him that a Dataphone Multiplexing service was being planned by Bell for introduction later this year. Some believe this might be an expanded version of the Bell Dattex multiplexing service offered for some years to time-sharing and similar customers.

The high increases by Bell may also be related to the fact the so-called AT&T TWX agreement with Western Union expired as of April 1.

With its expiration, AT&T can reenter the low-speed dial-up service area which it agreed to stay out of when it sold the TWX network to Western Union. "Under existing tariffs we will again offer dial-up low-speed service," an AT&T spokesman said.

But many of the Series 1000 customers cannot tolerate dial-up rates and delays. One large network user said his operation could not tolerate the longer response time associated with making a dial-up call for each transaction.

Rates Called Discriminatory

From the regulatory standpoint, many users feel the higher rates are discriminatory. One expert pointed out that line charges were increased more than 30%, but that the cost of Bell teletypewriters that operate at Series 1000 speeds went up only 3%.

This indicates that the impact was purposely lessened in the terminal area where Bell competes with other vendors while the lines (where AT&T is one of the few carriers) got the brunt of the higher costs.

One of the major drawbacks to converting the low-speed equipment is that it is designed to operate with DC interfaces. "We are deriving multidropped circuits that are more cost-effective than dial-up alternatives," one user at Household Finance said.

"If we want to modify our hardware equipment, we will have to pay over $1 million to IBM for field modifications. This is not realistic because this equipment is subject to change within the next few years anyway," he said.

The rate hikes will cost Household about $87,000 more per month. A new channel termination charge will cost $68,000/mo.

Household uses a version of the IBM Selectric typewriter called the 1980. This has a control unit with buffering capabilities called the 1971 or a 7441. This equipment operates strictly at 75 bit/sec, he said. "It is a very bad day as far as we are concerned," he added.

One of the most distressing aspects of the increase, according to some regulatory experts, is that it may be the first of several.

The Series 1000 rate hikes were a Bell reaction to a Federal Communications Commission (FCC) order that AT&T bring all of its interstate services up to the 9.5% rate of return authorized by the commission.

Since many other private line services favor larger users with some types of discounts compared with actual AT&T costs of providing the service, these experts expect similar increases.

IBM Charged With Strikebreaking

(Continued from Page 1)

tor. Earlier this year a New York State "fact finder" recommended a 4% cost-of-living escalator.

The county executive recommended no cost-of-living increases, but approved the called-for step increases.

However, the New York state legislature, which passes on county wage increases, slashed the suggested step increase to a mere $65 for all employees, no matter what grade, the sources for county and union said.

Three hours later on March 17 the strikers were on the street.

In the DP department, two systems analysts, four programmers, three operators, five keypunch operators and "three or four" employees hired under a federal job stimulation program, plus the manager of operations (who also serves as the assistant DP manager) all are out on strike.

An IBM corporate spokesman said "it is our practice to respond to customer requests for normal IBM service and guidance. This was the case in Orange County, where customer management requested our instruction on operating the system.

"Two IBM employees responded to the request. There were no picket lines at the customer location when they arrived nor when they left," he said.

"They instructed the customer on the basic operation of the system and then left the location," he added.

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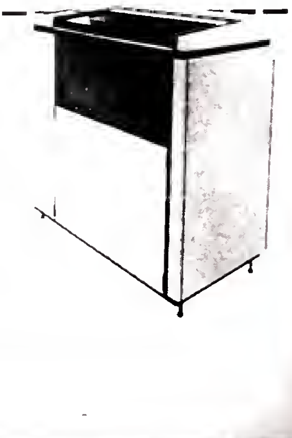

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User Explains the Attraction

By Nancy French

Of the CW Staff

COLUMBUS, Ohio — "I've been in this business since 1962" and the Singer System Ten "is the first piece of hardware that's turned me on in eight years," Carlton Mathews, president of Forum, the Singer Business Systems User Group, said in an interview last week.

It's a slow machine with a 3.3-msec cycle time, he said, but it's a truly interactive machine.

In fact, the functions that many manufacturers leave to software — an executive routine or a resident supervisor — are performed by hardware in the System Ten, he said.

In the 360, for example, a software supervisor controls which partition has control at any given point in time. In contrast, the System Ten controlled that with an electronic rotary switch, eliminating software overhead, he said.

"With my four-partition System Ten it's just like having four 10K computers sharing 10K of common core containing all the disk input and output routines," he said.

"With four partitions I can be doing four jobs concurrently," he said.

Two weeks ago, at 4:00 in the morning, he recalled, lightning struck. Even though the fuses blew, the power got through and destroyed some cards in the arithmetic control unit and blew a main power supply in the CPU, he said.

By 8:30 a.m. service personnel had determined exactly where the problem lay, replaced four boards in the arithmetic control unit and replaced the primary power supply unit with the auxiliary power supply.

"A new unit was put on a Greyhound bus and we had it by the end of the day.

"We were still able to get the work out — on two partitions, and by 7:00 p.m. I had the full computer up and running again.

"There aren't many other manufacturers who could do that," he said.

Group Asks TRW to Keep Making 'Ten'

(Continued from Page 1)

using the System Ten for both the immediate future and the long term."

Many users who have plans to expand their current configurations as they continue to develop new applications are reluctant to continue ongoing development or even to remain System Ten users if faced with ultimate conversion because of unavailability of hardware, the statement further said.

"To answer this question it is essential we receive from TRW an indication of their future plans for System Ten manufacturing . . . within the next three to six months," the statement said.

In addition, the users added, "we firmly believe there is a vast untapped potential for the System Ten product line in the marketplace and believe that a decision to continue manufacturing the product line will be to our mutual advantage."

Mathews and Don Sanford, Forum's executive director, will meet with TRW management in about two weeks to continue the dialogue begun at the meeting, he said.

Users do not fear increases in prices for leases or hardware maintenance, Mathews said, adding that continuity of the product line is their main concern.

The Chicago meeting was largely unproductive from an information standpoint, according to Mathews.

In general, the presentations were an introduction to TRW, its commitment to technology and a quality product and an outline of the company's history.

Users were "relieved from the technical standpoint" when they learned TRW would assume responsibility for customer support following Singer's announced departure from the business, Mathews said.

TRW is well known for its products in commercial aviation, its automotive activity, and its high-technology contributions to the space program, he said.

At the meeting, questions from the floor largely concerned TRW's commitment to Singer's users.

Asked about its long-term commitment, a TRW spokesman said he did not regard five years as a long-term commitment and that the conglomerate was in the computer business for the long term.

He also said TRW wanted Singer customers to be satisfied with its support of the software and hardware, Mathews said. However, he declined to answer a question from the floor concerning TRW's plans to continue manufacturing the System Ten computer.

One TRW official did say, however, that TRW will be evaluating each piece of equipment on a "product-by-product basis."

If TRW does decide to manufacture the product line, it will be the first such firm to do so after assuming responsibility for an existing customer base, an observer pointed out.

In discussing the users' current situation, Mathews drew an analogy between Singer's position a few months ago and that of Burrough's Corp. in 1960 when "it was doubtful that mainframer would be able to continue in the computer business."

At that time a thorough analysis showed that, at the rate it was going, Burroughs could not be profitable until 1969. But Burroughs decided to bite the bullet and, with good management, became profitable in 1967, he said.

ACM Plans Trial Of Self-Testing

(Continued from Page 1)

have learned something I should have known,' " the committee said.

"The committee is convinced that most computing professionals are conscientious and . . . eager to appraise their own knowledge and take steps to correct deficiencies," it said.

The questions to be published will be a sample of a full self-assessment procedure, which would normally consist of several hundred items, the committee said. They will cover program structure and modularity, indexing, searching and buffering and blocking.

A questionnaire will be included which the ACM hopes will help it determine program acceptance and the effect of the procedure on those taking it.

ACM members receive *Communications* as a member benefit; others may obtain a single copy for $5 from the ACM, Order Department, P.O. Box 12105, Church St. Station, New York, N.Y. 10249.

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WANG

Limiting Access to Tax Returns Could Hamper Federal Work, Privacy Group Told in Hearings

By Nancy French

Of the CW Staff

WASHINGTON, D.C. – Cut off access to federal income tax returns and the work of many government agencies will be brought to a halt or at least seriously hampered, government witnesses told the Privacy Protection Study Commission here recently.

The witnesses were commenting on the commission's draft amendments to the Internal Revenue Service (IRS) Code – amendments that would assure the privacy of tax returns by prohibiting their dissemination without the prior written consent of the individual taxpayer.

Both the Justice Department and the Securities Exchange Commission (SEC) witnesses testified that without tax returns, many "sophisticated" white-collar criminals could never be caught.

The commission's proposal that judicial warrants be required before income tax returns could be obtained for use in investigating nontax offenses would prevent investigators from getting tax records at all, Deputy Attorney General Harold Tyler explained, since to obtain a search warrant the investigator has to show probable cause that a crime has been committed.

In fact, Tyler said, the tax return is often the only evidence of the crime.

Stanley Sporkin, director of the SEC's Division of Enforcement, said the white-collar criminal who is frequently the subject of SEC investigation is sophisticated in financial methods and techniques and can be flushed out only by developing a "paper trail" of documents that prove violations have occurred.

Information on a criminal's federal income tax return is often inconsistent with the information gathered from the records of brokerage firms, corporations, banks and telephone companies and from SEC filings and can provide important leads to additional information sources, he said.

State Audit Problems

If the states were deprived of the tax data currently being provided on the IRS' individual master file tapes, they would have to recast and expand their audit programs, resulting in costly duplication of such activity on the state level, William H. Forst, speaking for the National Association of State Tax Administrators, told the commission.

IRS-provided tax data is an "integral part of tax administration by nearly every income tax state. In addition, non-income tax states use this information in the administration of intangible personal property taxes, occupational taxes, estate taxes and excise taxes," he said.

The commission's recommended amendments fail to mention the IRS audit adjustment of tax returns – an essential element in the states' enforcement effort, he said.

If this information was denied the states, they would either lose large amounts of enforcement revenue or would have to expand their own audit programs to a major extent.

Thomas S. McFee, the Department of Health, Education and Welfare's (HEW) deputy assistant secretary for management planning and technology, told commission members their amendments would obliterate the existing agreement that permits guaranteed study loan program administrators the information they need to trace those who have defaulted on student loans.

A second HEW activity that would be hampered would be the Social Security Administration's income verification procedure in which eligibility for programs such as the Supplemental Security Income program is determined.

Witnesses defended their internal procedures that assure security and privacy of the returns that are requested.

All requests from the Justice Department are signed by the U.S. attorney general, the deputy attorney general or a U.S. attorney, Tyler said. Only those staff members with a "need to know" see the returns, and their use is limited to the purpose for which they were requested, he added.

As for the SEC, its requests for tax information are signed by the SEC chairman.

SEC investigators have been cautioned about the confidential nature of tax returns and informed of the prohibitions contained in existing law regarding unauthorized disclosure of such information, he said.

Threat to Income Matching Seen

WASHINGTON, D.C. – The Privacy Act of 1974's prohibition against use of the Social Security number by state and local governments which have no statute authorizing its use could kill the federal-state tax information exchange program, according to William H. Forst, president of the National Association of Tax Administrators.

Under the federal-state exchange program, income claimed on state and local tax returns is verified by comparing it to the income claimed on federal returns by matching Social Security numbers in these computerized records, Forst told the Privacy Protection Study Commission during recent hearings here on the commission's draft privacy amendments to the Internal Revenue Service (IRS) code.

States presently obtain this information on magnetic tape directly from the IRS.

Forst asked the commission to consider an amendment to the IRS Code permitting states to use the Social Security number for tax administration purposes "notwithstanding" the prohibition contained in the Privacy Act.

IRS Head Urges Law On Sharing Tax Data

WASHINGTON, D.C. – Sharing data from individual tax returns with third parties should be defined by law, not by today's standard – the Executive Order, according to Donald C. Alexander, commissioner of the Internal Revenue Service (IRS).

In testimony before the Privacy Protection Study Commission here recently, Alexander said he supports the commission's effort to limit sharing information from federal tax returns and advocated no sharing be permitted unless the request could pass two tests:

- The information must be necessary to the functioning of the requesting agency.
- The information could not be obtained reasonably from an alternative source.

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Jung Claims Justification for Criticism of SSA Plan

(Continued from Page 1)

"Based on their informal contact with Mr Jung," he continued, "we have requested specific details regarding the Univac 70/35 simulation package from the CIA. We have no knowledge of the supposed contact with the Pentagon.

"When the requested information is available," Overs said, "it will be subjected to technical evaluation as with any product or service that may be of potential use."

For 45 days last fall, Jung was put on special assignment by the SSA to document recommendations he had made before a House Subcommittee on Public Buildings and Grounds a year ago.

Suggested Scrapping Operation

Following his review of the administration's computer operations, Jung suggested the SSA transfer all work performed on its medium-scale operation - 10 IBM 360/30S and two Univac 70/355 - to its large-scale operation which consists of two 370/168s, two 370/165s and 13 360/65s.

By scrapping the medium-scale operation, approximately 14,000 square feet of space would be freed to house either two lossely coupled IBM 370/168 multiprocessors or four 370/168 uniprocessors to help the current large-scale set-up handle the additional workload.

Jung suggested using this space instead of building the $2.3 million temporary facility recently approved by Congress.

But "SSA computer facility experts" told Jung they had determined 20,000 square feet of space would be needed for the 370/168s and the required medium-scale program conversions to the large-scale systems could not be completed until October 1976 and would take approximately 49 man-years.

Conversion Time Disputed

Jung said he recognizes the SSA's use of the information from the CIA and the Pentagon to convert 158 medium-scale programs would represent an inefficient use of the larger IBM machines. But, he maintained, the computer capacity the administration has said it lacks is thus proved available.

"Depending on the number of modifications that may have to be done on the simulation package, the whole medium-scale transition could have been made in two calendar months with fewer people as opposed to the 49 man-years the SSA experts say is needed," Jung stated.

Overs noted "the 49 man-year estimate is based on a conversion which would fully utilize the facilities of the large-scale systems with minimum impact on existing large-scale workloads.

"While a 'transition' via simulation may require less than 49 man-years, it would require considerably longer than two calendar months, merely postpone the expenditure of resources to accomplish a full conversion and could impact the existing large-scale workloads," he added.

Jung maintained construction for modifying the current medium-scale room to receive the 370/168s – either uniprocessors or multiprocessors – could have been accomplished much sooner than is currently required with the $2.3 million temporary facility.

But "because of the costs, the medium-scale construction would have had to undergo the same prospectus and contract award process," Overs noted.

"Furthermore, electrical power is the primary timing constraint in the construction project and, since the same power requirements exist for either the temporary facility or the medium-scale area, there would have been very little difference in the time needed to accomplish either.

"The necessary transformer equipment has a six-month lead time for delivery plus additional time for installation," he contended.

Jung said he had understood SSA is currently paying rent on the four 370/168s and has them sitting in a warehouse. But Overs stated the equipment is still IBM's property and in the corporation's possession; no payments have been made yet, he added.

"Elimination of medium-scale operations and reuse of that space for installation of the IBM 370/168s does not negate the needs to expand present facilities and to construct a new computer center," Overs remarked.

"This is not to say the SSA does not plan to eliminate medium-scale operations. However, such an effort must be conducted in a staged and orderly manner," he added.

He emphasized justifications to expand the SSA's present faciliites and to construct the new computer center were submitted to and approved by Congress.

"The management of the SSA is confident that a review of those plans, presently being conducted by the General Accounting Office, will result in concurrence with the decisions to proceed with construction," he said.

Jung is equally confident that study will support his analysis. "The administration's management can't afford for me to be right today," he commented. "A year ago it could have."

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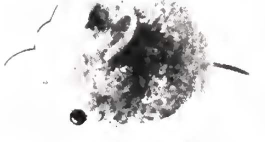

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In Two Long Island Counties

Consumer Outcry Generates Price-Marking Rules

By Catherine Arnst

Of the CW Staff

MINEOLA, N.Y. – Consumer complaints have caused two Long Island counties to pass regulations requiring prices be stamped on almost all items sold in supermarkets that gross over $1 million in annual sales.

The regulations, which will go into effect April 4, were ordered by the consumer affairs commissioners of Nassau and Suffolk Counties after a "tremendous outcry from consumers" who feared prices would be removed with the installation of computerized checkouts that use the Universal Product Code (UPC), according to Ina Alcabes, public information officer of the Nassau County Consumer Affairs Commission here.

Two public hearings held on the issue in Nassau County in September and January were attended by "the largest turnout ever," Alcabes said.

In Suffolk County, "consumers' complaints numbered literally in the thousands, all unanimously opposed," James Lack, that county's commissioner of consumer affairs, said.

300 Stores Affected

Approximately 300 stores in the two counties, none of which have installed a complete point-of-sale (POS) system to date, will be affected by the regulations.

"It will be another year or so before those systems are actually here," Alcabes said, "but consumers are seeing the UPC code on the shelf already."

Consumers are chiefly concerned they won't be able to comparison shop if prices are removed and there will be no way of correcting a cashier who makes a mistake, she said.

"Many consumers also said, 'I work on a very tight budget and add items as I go along,' an advantage that would be lost if prices were removed," Alcabes added.

The commissioners of both counties agreed they are not opposed to POS systems; they only want to ensure that prices continue to be marked on items. Many consumers, however, are against the entire concept of POS, Alcabes and Lack said.

"Many felt the whole POS and UPC idea was just another problem with computers," Alcabes said.

Under the new regulations, stores must mark prices on all food items, detergents, paper goods and pet food. Exceptions include item-price sales, weekend specials, end of the aisle sales and any items not now priced, such as milk, eggs, and fresh produce.

Inspectors will regularly check that the regulations are enforced, failure to comply can result in a fine of up to $500 for each offense.

Supermarkets in Nassau County "agreed with the intent of the law, but thought they should have more time to implement it," Alcabes said.

In Suffolk, however, "the stores were unanimously opposed," Lack said. "They alleged it will sound the death knell of POS.

"I see it as an incentive to do what they should have done in the first place. The industry went from step one to step five with this idea without taking any of the steps in between," he said.

The supermarkets in the area contended unit pricing on the shelves is an adequate pricing method, but Alcabes disagreed: "The unit-pricing system is very poorly maintained," she said.

Lack also said unit pricing is inaccurate. "Until it is accurate, we will demand prices be marked on the item," he added.

Bolsters State Bill

The Long Island regulations should make "the case a little better" for a bill introduced last year in the New York State Legislature by State Sen. John J. Santucci (D-Queens) [CW, Feb. 26, 1975], according to Michael Kaplen, Santucci's legislative assistant.

That bill has been in committee since Jan. 8, and Kaplen feels its chances have improved for being voted out of committee.

"Other legislators have been made aware of the problem. There have been numerous articles and television programs on the issue recently," he said.

A statement issued by the New York State Food Merchants Association, which represents 23,000 food retailers, said "the association is opposed to regulations or legislation implementing price marking. It is discriminatory to our industry, premature in nature and counterproductive to the research and development our industry must do if it is going to serve the consumer in an efficient manner."

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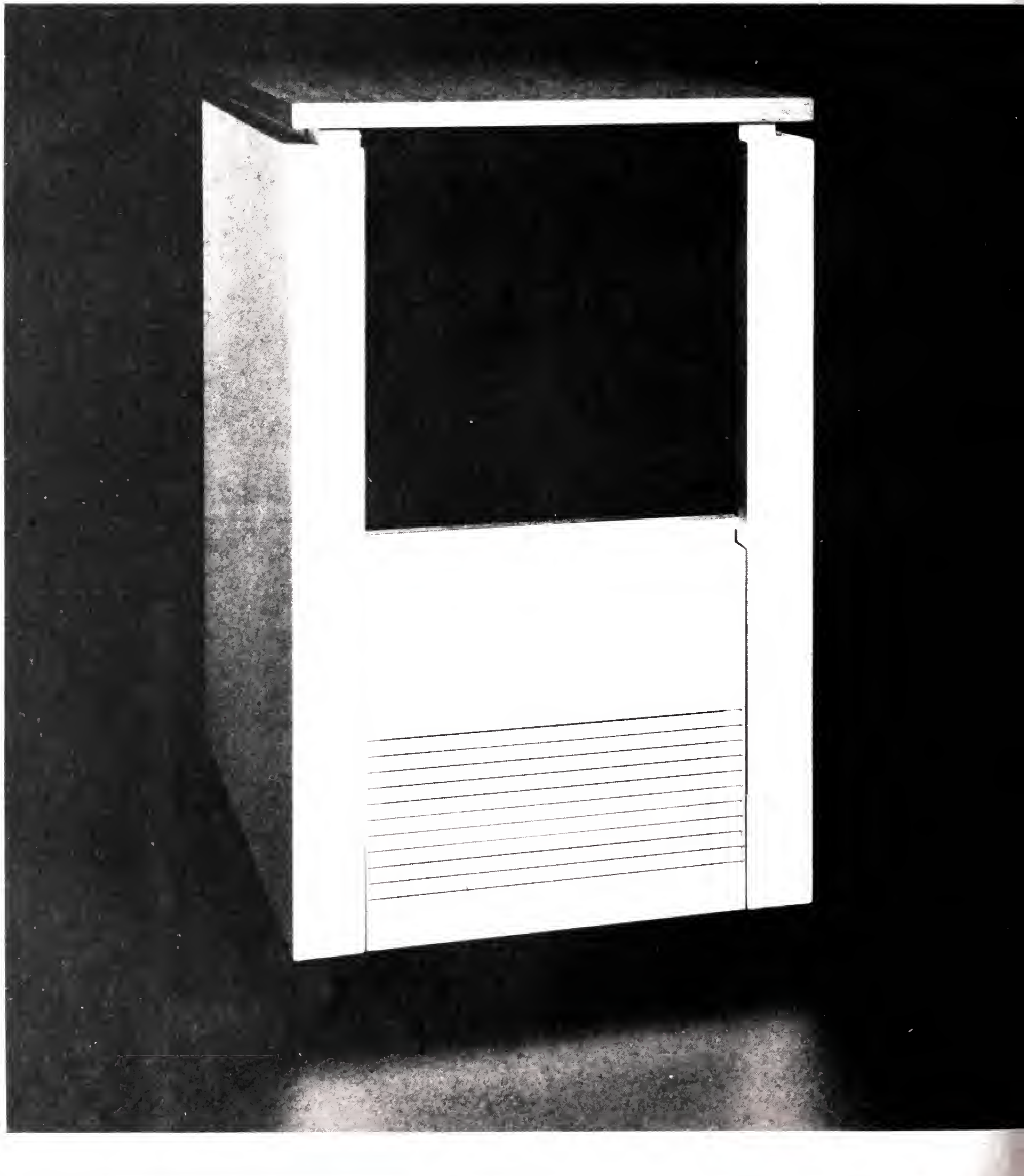

Calendar

April 20-22, New York – **24th Annual Microwave Research Institute Symposium** on "Computer Software Engineering." Contact: Jerome Fox, Polytechnic Institute of New York, 333 Jay St., Brooklyn, N.Y. 11201.

April 26-28, San Francisco – **Design Engineers' Electronic Components Show**. Contact: Tyler Nourse, Electronic Industries Association, 2001 Eye St. N.W., Washington, D.C. 20006.

April 26-30, St. Louis – **USE, Inc. Spring Conference** for users of large-scale Univac systems. Contact: T.R. Moenich, USE, Inc., P.O. Box 147, Perrysburg, Ohio 43551.

April 26-May 1, Los Angeles – **Reliable Computer Systems**. Contact: UCLA Extension, 10995, Los Angeles, Calif 90024.

April 27-30, Chicago – **National Microfilm Association (NMA) 25th Annual Conference and Exposition**. Contact: NMA 8728 Colesville Rd., Silver Spring, MD. 20910.

April 28-30, Houston – **1976 International EDP Conference**, sponsored by the Paper Industry Management Association (Pima). Contact: Pima, 2570 Devon Ave., Des Plaines, Ill. 60018.

April 28-30, Paris – **Fifth International Convention of Computers in Banking**. Contact: BBL Congres, 14 Rue Vignon, 75009 Paris, France.

Societies/ User Groups

ICCP President Hoping To Revive RBP-Type Exam

By Catherine Arnst
Of the CW Staff

CHICAGO – Fred H Harris, new president of the Institute for Certification of Computer Professionals (ICCP), hopes to resurrect some type of Registered Business Programmers (RBP) exam in 1976

Harris, director of the Computation Center for the University of Chicago, said he plans to place "highest priority on a new examination for business programmers which will be patterned after the RBP but will include multiple language certification."

Current RBP holders would automatically become certified under the program, he added.

"I'm very encouraged at the progress we are making, the quality of the support we've had and the potential for increasing that support from other areas," Harris said when he assumed office at the ICCP's annual meeting recently

He was referring in part to the increase in registration for the 1976 Certificate in Data Processing (CDP) exam which the ICCP administers. Registration increased 17% over 1975, numbering nearly 2,800, and new applicants increased by 30%

Harris outlined other priorities for his term in office, including a more aggressive effort to bring the certification message to industry and academia through a public information program, and continuation of awards for top scores in the CDP exam expansion

He also hopes to survey current CDP holders on the role of this designation in their professional lives

"We intend to maintain high standards for data processing personnel by emphasizing a broad educational framework and practical knowledge as desirable personal objectives," Harris said of the ICCP.

"We will continue to promote the recognition of a corps of individuals having knowledge important to data processing and information management.

"Finally, we will continue to support a firm foundation for the continued growth of the data processing field," he said

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In addition to full-length papers, contributions for the "Short Notes" session featuring five- to 10-minute presentations (without publication) and suggestions for panel topics and participants are also requested.

Papers are solicited in the areas of microprocessor development and applications, distributed processing, software development and support, system technology, real-time systems, component technology, memories and applications in various fields.

Exceptional papers not directly related to the conference theme will also be accepted.

Prospective contributors must submit four copies of an informal digest of approximately 1,000 words by April 1, with formal papers due June 30.

Panel suggestions should be received by April 15, and 200- to 300-word summaries for "Short Notes" are due Aug. 1.

All suggestions and contributions should be sent to Paul L. Hazan, Program Chairman, Johns Hopkins University, Applied Physics Laboratory, Johns Hopkins Road, Laurel, Md. 20810.

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Our new 4000-Plus minicomputer-based timesharing systems offer a number of plusses over the highly successful 4000 series:

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And while the new 4000-Plus systems give you these ease-of-use improvements, they still offer the advantages that made the earlier 4000 such a good timesharing system. Like hierarchal access, on-line software mobility, and a wealth of system management features. Like BASIC-X, the user language with the simplicity of BASIC and the sophistication necessary for demanding business and scientific applications. And a 4000-Plus system is still readily expandable—from 8 to 256 ports; from 7.5 megabytes to over 4 billion bytes.

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The one big minus? The Model 4000/15 timesharing system costs $35,950—representing a $20,000 reduction over the previous lowest-cost 4000. The bigger 4000/25 and 4000/35 systems are available at similar savings.

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3RD DAY: **COMPUTER NETWORKS:** Distributed Computing. Network Planning/On-Line Terminals and their Applications. Front-End Processors/Selection and Use.

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Register me for All three days 1st day 2nd day 3rd day
(Copy this form to register additional people. When you register for three or more days - for yourself or any number of individuals in any combination - you get a $5 per day multiple registration discount.)

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Check City in which you plan to attend:
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BUSINESS/INDUSTRY
10 Manufacturer of Computer or DP Hardware/Peripherals
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30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government – Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other

TITLE/OCCUPATION/FUNCTION
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other

Whether you want to catch up or keep up, sign up now!

Thank you, Washington!...

The Cherry Blossoms were out and Spring was in the air as well as 3,000 Washington-area computer people who attended the 1976 Computer Caravan's Forum and Exhibition. The exhibit floor was a Beehive (M) of activity as a wide variety of products and services were reviewed by key DP people. In addition to Beehive's Super Bee, Edit Bee and Mini Bee (B), there were: Varian's new V76 computer and VORTEX/TOTAL data base (E); Software International's wide selection of packages from MMS General Ledger to a full line of banking packages (F); Tandem's new "NonStop" computer (A); data communications and data management systems from General Automation, as well as GA's new minicomputers (1); Megadata's "POWER-SCOPE" family of intelligent, programmable terminals (D); Delta Data's new 4500 user-programmable display terminal and its 5270 light pen system (K); modems, couplers and printer terminals from Anderson Jacobson (N); Interdata's Computer Life Support exhibit, including the new IPAC packaged system, OEM minicomputers and the Carousel printer terminal (H); and Cooke Engineering's custom tech control systems for data communications management (C).

SPECIAL CONGRESSIONAL COMPUTER REVIEW IN WASHINGTON: On Wednesday night, the Caravan had a special session for the first time in its history to afford Congressmen and their staffs to see, first-hand, the uses of computers for political affairs. Shown in center circle (G) are Patrick J. McGovern, Publisher of *Computerworld* shaking hands with Representative Charles Rose of North Carolina, Chairman of the Computer Sub-Committee. Looking on are Ed Bride, Computerworld's Vice President of Editorial Services and Neal Gregory, Executive Director for the Computer Sub-Committee (1). Other pictures in circle show Computerworld's Publisher with John Swearingen, Staff Director for the Senate Committee on Rules and Administration and Sub-Committee on Computer Services (2); Francis Valleo, Secretary of Senate (3); Congressman James Abdnor from South Dakota (4); and Congressman Jerry Patterson of California (5).

...for Cherry blossoms, Congressmen, and a Capital reception for Computer Caravan '76. Caravan this week is in... Detroit.

See you there!

Exhibit Hours - 10A.M. - 5P.M.

DETROIT	Mar. 30-Apr. 1 Cobo Hall
CHICAGO	Apr. 13-15 McCormick Place
DALLAS	Apr. 20-22 Market Hall
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SAN FRANCISCO	May 11-13 San Francisco Civic Auditorium

COMPUTER CARAVAN 76

Sponsored by COMPUTERWORLD

Editorial

Nobody Scanned the Consumer

The truth is finally out: the Universal Product Code (UPC) and the scanning checkout terminals designed to read the UPC in supermarkets have been a failure.

So said *Business Week* in a recent and forthright analysis of what went wrong with industry projections and expectations.

According to the article, the industry had expected that about 1,000 supermarkets would by now be equipped with UPC-compatible terminal systems instead of the "paltry 50" that are actually in operation.

The article correctly pointed out that the "major reason for the delay [in installing more UPC terminal systems] is consumer resistance to the elimination of item price marking" (see related story on Page 12).

The most disconcerting portion of the article is its futile conclusion that the failure is irreversible. It speaks of a series of miscalculations that may have cost vendors their market for terminal equipment and supermarkets their chance to get some cost savings.

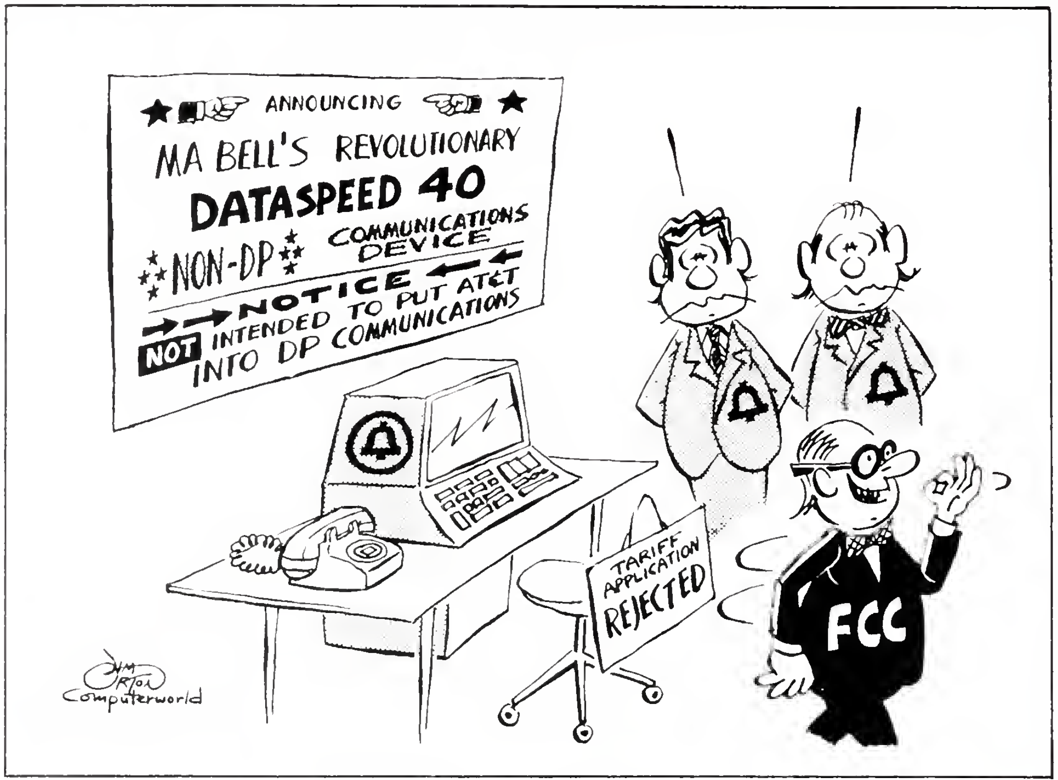
The message that comes through all this is more than a lack of attention to the consumer insistence on price marking. There is first an implication that it may be too late to explain to the consumer that there are real benefits for everyone to be gained from the UPC.

There is also the lack of determination on the part of the supermarket industry and the vendors to stress the public benefits of UPC systems in an all-out educational effort. Certainly if this were just a case of miscalculations, it might be possible to correct these early failures with some careful public relations campaigns.

This leads one to the conclusion that perhaps, just perhaps, there never were any real benefits for the consumer, and the cost savings for the supermarkets have been exaggerated.

If this is true, then someone had better take a long hard look at other "revolutionary" terminal systems that have also been something less than overwhelming successes. These include banking and retail store systems and the highly overrated "emerging" terminal in the home.

Maybe the consumer is really saying that the industry should provide equipment that can truly make everyday operations easier, instead of simply embarking on money-making projects that benefit only the vested interests.



'Indeed It Won't, Gentlemen . . .'

Letters to the Editor

Prefix Impairs Readability In a Properly Designed Program

The only responses I have seen to William B. Simmons' article on Cobol paragraph names ["Functional Paragraph Names Key to Cobol Clarity," CW, Jan 26] seem to have missed the point.

Two letters have suggested a fairly well-known technique of adding a numerical prefix to every paragraph name.

The point they have missed, which was clearly stated in the article, is that nonunique names are useful in a proper program (logically separate functional routines, each having one entry and one exit, no more than one page in length). Perhaps these writers have never had a proper program to work with.

Simmons' thesis was an application of a rule we have been expounding to Assembler programmers for years: For gosh sakes, let's not clutter up the program with names which appear to be functional, but aren't.

If a label marks the beginning of a routine that does something, fine. If not, giving it a mnemonic name only impairs the readability of the program.

H.E. Byars

Kingsport, Tenn.

RCA 'Boo-Boo' Renews Anger

Articles such as "Did $100 Million Mistake Lead to RCA Exit?" [CW, March 8] don't do much for the thousands of RCA System Division people who were thrown to the wolves in September 1971. What this article did do was renew the anger felt by those whose time investment in RCA was sent down the drain.

Because of management's "boo-boo," families suffered loss of income because RCA people were considered nonsellable in the job market. The loss benefits such as retirement and insurance were felt by many.

Many were forced to take whatever they could get as analysts and programmers, sometimes taking a lateral move in salary and having to wait certain appraisal periods before expecting an increase. The $100 million boo-boo isn't easy now, but at least we can laugh a little.

E. Chapman

Chicago, Ill.

'They' Never Listen

I was intrigued by a column in the issue of March 8 written by Herb Grosch and titled "They Never Learn."

It began by stating that while the working manager of one of the major credit-reporting operations presented a paper at a workshop on privacy and security in computer systems, Grosch " . . . rehearsed an argument . . . [he] . . . had used . . . about five years ago."

One would think that the working manager of a major credit-reporting operation might say something worth listening to, whether we agreed with him or not.

Since Grosch devoted the rest of the column to a rehash of his five-year-old argument, I shall never know. But I do know why "They never learn." It is because "they" never listen.

Jim Jinkins

Oak Ridge, Tenn.

Article Useful to Users

The article on correct JCL to gain the benefits of Rotational Position Sensing (RPS) on 3330-type disk units [CW, March 15] is an example of the sort of thing I would like to see in *Computerworld* more often.

It provides information users can use.

My congratulations to the author, James Radosevich, to the Naval Audit Services, and to CW.

Bob Brown

Atlanta, Ga.

Data Past

Five Years Ago
March 31, 1971

CHICAGO – Someone "put the fix" on computers operated by the Penn Central Railroad to shuttle at least 217 boxcars to a tiny downstate Illinois railroad, U.S. attorneys said.

– – –

SAIGON – While American military personnel were leaving Viet Nam, computers were being brought in to provide automated logistal operations support to the Vietnamese armed services.

Eight Years Ago
March 17, 1968

WASHINGTON, D.C. – The U.S. Navy released a test for Cobol compilers that took a half hour to check out language and object programs. The test is part of a package of aids originally designed to assist naval DP management in handling various standard language problems.

– – –

PHILADELPHIA – Univac developed an experimental fluidic Unit Record System replacement for the punched card from a technique proposed by the U.S. Army Electronics Command. The system utilized reusable wallet-size plastic cards. The prototype system processed cards at a rate of 300/min, but Univac expected an eventual speed of 1,200 card/min and minimal wear because of the absence of moving parts.

The Disconsolate Muse

Sad Clio! symbol of history; born of Mnemosyne, goddess of memory; sought after by the old; avoided by the young, who thrill to each reinvention of the wheel – we deserve poorly at her hands. Here we are, pulling and straining to do great things in our trade, and to have them recorded. And here we are, surrounded by the history of the sciences and the arts that started us on our way: language, mathematics, astronomy, the old and the new physics. One would expect the Smithsonian to be grubbing in the waste paper outside Armonk, like the reporter who picked through Kissinger's Georgetown house garbage – eager for the smallest clues as to how we got where we are. Alas! not so.

We have already lost Charles Babbage, Father Of Us All; Lady Lovelace, the earliest Grace Hopper; Herman Hollerith, first in ADP. Scraps of their lives and views survive – not enough. We have barely noted the departure of Comrie, who invented punched card computation; Wallace Eckert, first scientist in IBM; Bill Bell and Sam Alexander and Howard Aiken; Turing and Gill and Strachey; von Neumann and Vannevar Bush. Many others are alive but retired: John McPherson, first chairman of a Joint Computer Conference; Ralph Meagher, builder of the "good" ILLIAC. Some escaped to gentler climes: Andrew Booth, Charlie De Carlo, Mina Rees. And hundreds have just plain disappeared: Big John Lowe, pioneer at Douglas, and Earnest Clare Bower, who hired him: Cecil Hastings, the Great Approximator. Allan Benson, author of the first Los Alamos software package. You observe I am getting closer to home – have put aside the Knorad Zuses and the Couffignals. Some of the deaths, many of the escapes and disappearances, are of men and women in their forties and fifties – people that hundreds and perhaps thousands of CW readers have met and worked with. History is being unmade before our eyes.

Sure, many great ones are still at work, still inventive. One thinks of Maurice Wilkes overseas, of Seymour Cray and Aunt Grace here, and of those still creative in contiguous areas: Paul Armer, Jay Forrester. But we have information losses, and they were in Clio's eyes avoidable. History is not measured in centuries, not in our field – not even in human generations, or decades. We move lethargically, to overtake or record events zooming faster and farther than the space program.

Within its adamantine fortresses IBM hides several in-house history projects, and the loyalties of dozens of pioneers like Frank Hamilton and McPherson and Palmer. But when it sponsors Clio, it does so handsomely: the Computer Wall at 590 Madison; that ten-foot foldout poster on mathematics a decade ago.

The Smithsonian has aborted not only its promising Oral History project, but the useful curatorship of its scanty collections. AFIPS, ACM, IBM have tried to help: nothing seems to work.

The British are starting, but awfully late. The great science museum in Munich, the Japanese one in Ueno Park, are even further behind. Sad! And as for what happened in and near Bull, from the Thirties on . . .

There is a fresh initiative coming up this summer. Could be a horrid botch, could be terrific – at least, it's new. Los Alamos, which has been heavily into computing since Oppenheimer got it going in the early Forties, is holding an international meeting this summer, a research conference on computing history. By what at best is a most unfortunate coincidence, and quite possibly is something more devious, the timing seriously overlaps that of the National Computer Conference in New York. Moreover, the emphasis looks to be on reminiscence, not on process. What is needed is not one more (yawn!) replay of Mauchly, Eckert, Goldstine and Zuse – but a plan to set up a systematic history project under IFIP or Deutsche Museum or IBM auspices or at a great university like Cambridge or Harvard. The Smithsonian, unless Tom Watson personally puts a hammerlock on [illegible] Dillon Ripley, is apparently beyond hope; those of us who contributed tapes may well have to sue to recover the material on them.

The other thing the Los Alemites could do would be to make a first cut, perhaps under the guidance of Heinz Zemanek, past IFIP president, at a tree structure of computer hardware and software and applications history. Whole branches are unexplored today: how did organizations and publications and conferences start? SHARE made an effort, some years back. How did pioneers travel and visit? John Bennett took Cambridge and Illinois know-how to Sydney. Havens took NORC know-how to Nice; Goto came from Tokyo to Yorktown Heights. What is hidden behind security curtains, after all these years? Much? There are senior Americans and Britishers who know.

Now, that's what would be valuable, from the old-timers and the senior professionals and the historians in New Mexico. Their few days together could be tremendously productive – or just another disappointment to the Muse.

Herb Grosch

Two Bytes Can Help Avoid Duplicate-Mailing Abuses

The Taylor Report
By
Alan Taylor, CDP

Edward Rossner, a Pennsylvania systems analyst, recently discovered that using two control bytes in a mailing address enabled him to search out duplicates in a magazine subscription file.

This pleased him, because until this year the approach of audit time for the magazines subscription list was simply not comfortable for him. This year, he told me, it was a breeze. He was not worried at all – because some 2,000 suspected duplicates had been found and handled beforehand.

Rossner, however, was not satisfied with his own success. He is looking further and thinking of the many addressing problems that have been covered in this column which are giving computers a name for stupidity and arrogance.

"This method, crude, simple or whatever," he said, "has proven to be most effective in our subscription system. Maybe it could work in others if they had this information on how I solved the problem.

"I'd be glad to answer any qustions from you or your readers pertaining to subscription fulfillment or duplication in such a system."

The important part of this is the idea that a method which helps subscription fulfillment can help other areas. I think it can – but first let us look at the Rossner method for finding duplicates.

In the subscription file Rossner works with, there are four types of addresses. These are:

- Name only.
- Name and title.
- Company.
- School or government.

Three of these types – name only, company and school – follow the normal rules for the first line of a mailing address; but the fourth type, name and title, uses a slash separator between the name and the title.

Each of the types is categorized in the files – Type 1, Type 2, etc. And there are the two bytes: the address-type byte and the title-separator byte.

Title-Separator Byte

Rossner finds the title-separator byte useful because it permits maximum use to be made of the 25 bytes of the name and title field. If the subscriber's name is long, the title can be compressed if necessary.

Where there are shorter names, fuller titles can be given. Mailing ease and accuracy are both improved, as is courtesy.

In the cases of school-only and company-only addresses, there is often the equivalent of a name. Very frequently the name is "library," or "reception, 1st floor."

If the system did not distinguish between real name types and these pseudo names through the use of the address-type byte then these would be mixed in with mailings that were addressed to people, with ludicrous results.

As it is, Henry Floor is in no danger of being mixed up with the First Floor, because the system provides for their being easily distinguished.

The duplication identification program uses the title-separator byte to focus itself on assumed last names. The technique is simply to start at the last byte of the name field and back up through the field until finding a "slash."

Then the test is changed to look for a blank rather than a slash. All the nonblank characters between the slash and the immediately preceding blank are regarded as being the provisional "last name."

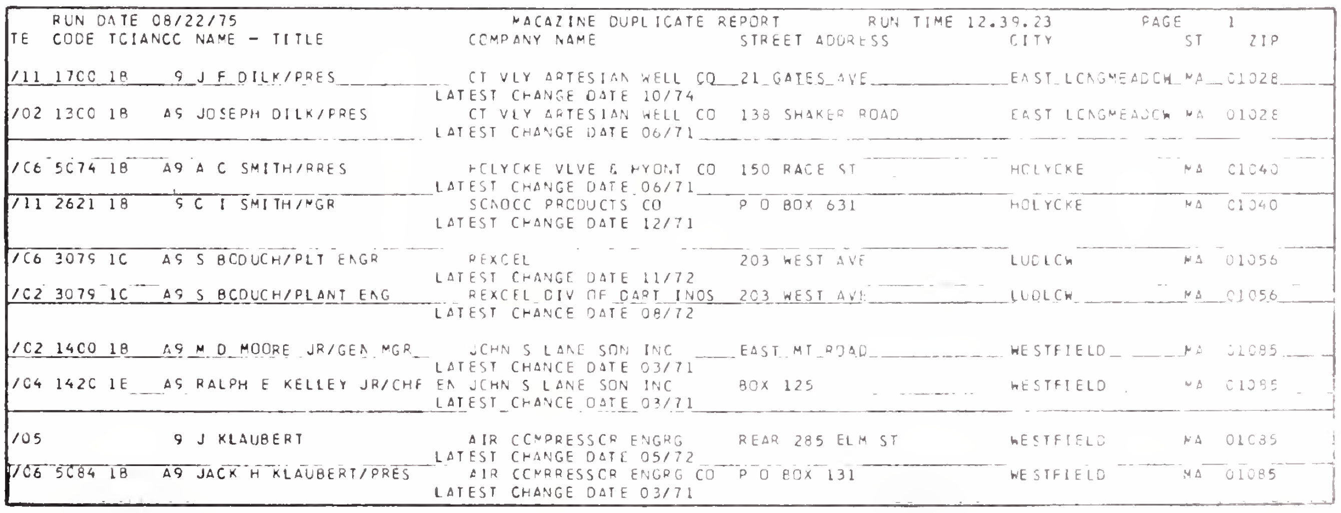
This provisional last name is then used in conjunction with Zip codes to provide a sort key.

If there is no slash in a name-and-title field (as does in fact happen even though it shouldn't) then the record although coded as a name and title address, is treated as a name-only address. Here the assumed last name is found by backing from the end of the name field through any trailing blank characters, through the assumed last name and stopping when a blank after nonblank character is found. (The sort key is constructed in the same way as in the case of the name-and-title records, and both name-only and name-and-title records are then sorted together to find apparent duplicates (see figure).

Would Prevent Blunders

Naturally the selection of four specific address types reflects the particular subscription list for which the system was designed. However, [illegible] known names into the categories [illegible] and [illegible] using school-type mailing addresses or company-only ones, would have prevented some of the blunders about which readers

(Continued on Page 16)



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    RUN DATE 08/22/75                          MACAZINE DUPLICATE REPORT       RUN TIME 12.39.23          PAGE    1
TE  CODE TCIANCC NAME - TITLE               COMPANY NAME            STREET ADDRESS          CITY                ST     ZIP

/11 17CC 18     9 J F DILK/PRES             CT VLY ARTESIAN WELL CQ  21 GATES AVE            EAST LCNGMEADCH MA   C1028
                                          LATEST CHANGE DATE 10/74
/02 13CO 18    AS JOSEPH DILK/PRES          CT VLY ARTESIAN WELL CO  138 SHAKER ROAD         EAST LCNGMEADCW MA   01028
                                          LATEST CHANGE DATE 06/71

/C6 5C74 18    A9 A C SMITH/RRES            HCLYCKE VLVE & HYONT CO  150 RACE ST             HCLYCKE         MA   C1040
                                          LATEST CHANGE DATE 06/71
/11 2621 18     9 C I SMITH/MGR             SCNOCC PRCDUCTS CO       P O BOX 631             HOLYCKE         MA   C1040
                                          LATEST CHANGE DATE 12/71

/C6 3079 1C    A9 S BCDUCH/PLT ENGR         REXCEL                   203 WEST AVE            LUDLCW          MA   01056
                                          LATEST CHANGE DATE 11/72
/C2 3079 1C    A9 S BCDUCH/PLANT ENG        REXCEL DIV OF DART INDS  203 WEST AVE            LUDLCW          MA   C1056
                                          LATEST CHANCE DATE 08/72

/C2 1400 18    A9 M D MOORE JR/GEN MGR      JCHN S LANE SON INC      EAST MT ROAD            WESTFIELD       MA   01085
                                          LATEST CHANCE DATE 03/71
/04 142C 1E    AS RALPH E KELLEY JR/CHF EN  JCHN S LANE SON INC      BOX 125                 WESTFIELD       MA   C1085
                                          LATEST CHANCE DATE 03/71

/05             9 J KLAUBERT                AIR CCMPRESSCR ENGRG     REAR 285 ELM ST         WESTFIELD       MA   01C85
                                          LATEST CHANGE DATE 05/72
/06 5C84 1B    A9 JACK H KLAUBERT/PRES      AIR CCMRRESSCR ENGRG CO  P O BOX 131             WESTFIELD       MA   01085
                                          LATEST CHANGE DATE 03/71
```

The above partial printout shows an early version of the duplicate report. The address-type byte (in this case always "1") appears under the "T" heading just after "CODE," and the title-separator byte can be seen between the name and title in the name/title field.

THE MATCHMAKER

Telefile introduces the only disk system flexible enough to match any minicomputer with any of the hot, new 3330-type drives. Big disk storage at a mini price.

Telefile now has available the most flexible large capacity disk system for minicomputers on the market today The Matchmaker It comes two ways

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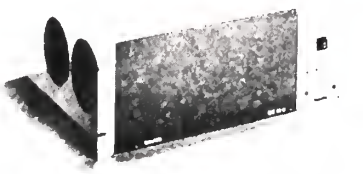
You've seen them announced one-by-one and they're coming on strong CalComp's Trident. Control Data's Storage Module Diablo's 400 Series The Ampex 9000's and Memorex 677's Each builds upon IBM 3330 technology, which means higher storage densities and new circuitry for superior reliability

To switch drives, simply change one controller circuit board We've timed it at 63 seconds flat!



Compatible interfaces to eleven minicomputers.

We're designing a complete line of compatible interface boards to match up to many minis: Data General, DEC, Interdata, Keronix, D.C.C., Microdata, Honeywell, Lockheed, H-P, Varian, and Cincinnati Milacron. Simply fit our tailor-made computer interface module inside your computer chassis and you're in business. If you have another type mini, we'd be glad to design one for you.

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Your designers may want a piece of the action. Our general interface board makes it easy. Your board will tie in directly, bringing big disk storage to *any* 16-bit minicomputer.

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The Matchmaker is our smallest controller yet It is totally self-contained right down to its power supply and cooling system. It's small enough to tuck away in a drive housing or in a rack above, below, or even *behind* the computer. Out of sight

We'll even make you a faceplate.

If you want to show the Matchmaker off, we'll make a bezel to match your computer panel. Private label it and call it yours. There's no end to the flexibility.

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Five circuit boards slip right in from the front of the DC-16-C Matchmaker. A disk interface board, a general interface board, a command/timing board, a memory/address board, and an optional maintenance board for offline disk pack formatting and test exercising.

Unmatched features

- Contains 512-byte buffer for data rate matching
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For years, we've helped minicomputer users grow their disk capacities. Now our Matchmaker system is a quantum leap forward. A new in-depth, hot-off-the-presses Matchmaker technical manual gives you all the facts. Write for it. Prove to yourself that this is one disk controller no one else can match.

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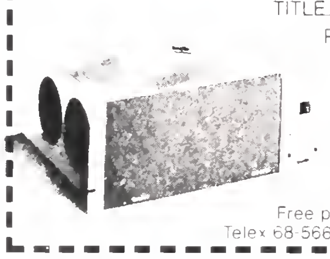
Turning minis into maxis with moxie

THE MATCHMAKER



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Adding Two Bytes To Programs Avoids Duplicate Mailings

(Continued from Page 17)

have been complaining.

There would be no more "Dear Mr. Programmer," or "The Floor family would have improved mobility," etc., etc.

Taking the breakdown a step further (and only four of the name types are currently used, so there is plenty of information space still available on those two bytes), the sex of the name, if known, can be added, as also can the marital status, if anyone cares. This would stop the "Dear Mrs. Wisconsin" mailings addressed to the University of Wisconsin, etc.

In fact, Rossner appears to have simply delineated just how little is needed to retain control of the sense, as well as of the content, of mailing names. And it comes at only two bytes!

This seems cheap enough to me to say that people handling mailing lists and making money on their use should easily be able to avoid the excesses of annoying thoughtlessness that have marked their past activities.

Otherwise, they should be forced to admit it is their own carelessness, rather than either economics or the computer state-of-the-art, which is causing the problem. And that in itself would be an advance.

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Memory Dump

(answers to last week's crossword puzzle)

A	S	C	I	I	■	U	S	A	■	D	R	I	V	E
P	E	P	■	C	A	S	E	T	T	E	■	L	E	S
E	N	U	R	E	■	A	C	T	■	F	I	L	E	S
■	S	■	U	■	A	S	T	I	R	■	N	■	R	■
L	E	A	S	E	■	I	O	C	■	A	P	I	S	H
I	■	T	E	N	S	■	R	■	S	C	U	D	■	Y
T	I	■	S	C	A	R	■	P	A	C	T	■	P	B
E	B	B	■	O	V	E	R	F	L	O	■	A	I	R
R	N	■	A	D	I	O	■	C	L	U	E	■	P	I
A	■	E	V	E	N	■	R	■	E	N	N	E	■	D
L	A	B	O	R	■	H	E	R	■	T	A	P	E	S
■	D	C	W	■	C	O	B	O	L	■	C	O	T	■
M	O	D	■	O	■	A	A	A	■	I	T	C	H	Y
S	R	I	■	F	O	R	T	R	A	N	■	H	I	D
U	N	C	U	T	■	Y	E	S	■	D	I	S	C	S

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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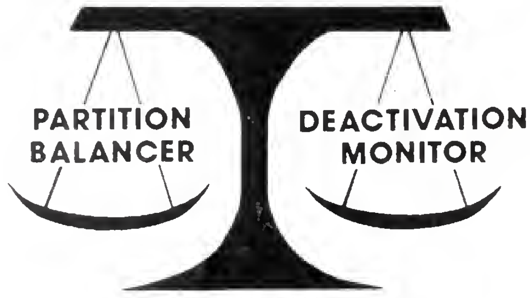

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22 Director/Manager/Supervisor DP
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32 Programmer/Methods Analyst
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42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
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80 Librarian/Educator/Student
90 Other

Detach here, fold, and place in post-paid envelope attached through binding.

Ease of Use Important

Audit Packages Aid Independent DP Operation Review

By Catherine Arnst
Of the CW Staff

WASHINGTON, D.C. – An audit package ought to be easy to use, and "don't be too concenred with the prettiness of a report being generated: be concerned with the contents," Nander Brown, DP audit manager for the U.S. Department of the Interior told Computer Caravan attendees here recently.

Audit software allows the auditor to retrieve detailed information directly from the computer system. "It allows the auditor to select items of particular interest," he said.

Some of this information may already by contained in standard reports, but not in the exact format needed by the auditor to get "the exact picture of where a system stands," Brown added.

It is also important that an auditor go to the source data directly rather than depend on a programmer to do it if the auditor is to remain independent, he continued.

Many times, however, auditors don't know what they want to get from a file until after they are into it, Brown said. "If you have only a one-time requirement, your first inclination is to write a program, which is like reinventing the wheel."

An audit retrieval package is a more efficient way to go, he said.

It "could pull data in many different forms, massage it and print it out in a fraction of the time it would take to write a separate program," he said.

Coding Trade-Off

A major operational consideration of an audit package is how much coding is needed, Brown said. "There's a trade-off here: the more information you get, the more coding you have to give," he said.

"We try to get simple coding – there is more lengthy coding that also gives more, but the learning requirement is different."

The processing consideration involved in an audit package is "what can that package do," according to Brown. Packages come in certain logical structures that determine in part what they can do, he added.

Two types of structures he described were the precompiler and generator type.

The precompiler package is transferable from one manufacturer's computer to another, while the generator type it dedicated to one machine, he explained.

Brown's installation uses a generator package for doing one run and the precompiler when doing many. The generator package, Standard Utility for Debugging or Auditing (Suda), was designed by Brown.

"There are a number of time requirements where information is needed to monitor a system to insure that the system designed three years ago is still working the way it was meant to," he said in describing some of the situations where a generator structure is useful.

The precompiler used by Brown is the Auditors Uniform Data Inquiry Technique (Audit), which was designed for the Army Auditor Unit by Ted Rolig, DP program director for the Defense Contract Audit Agency.

"Audit is a method for implementing an idea," Rolig said. Without it the method used to obtain a [illegible] the auditor to go to a DPer and [illegible] it the DPer then develops a program which generates that report from the computer, he explained.

"What Audit does is remove the DPer from doing mundane report generation and allows the auditor to go directly to the computer himself."

A development consideration that went into Audit was that the "auditor only needs to know how to specify his idea in succinct terms – he's not a DPer," Rolig said.

Consequently the program must be easy to use, transparent to all operating systems, machine independent and cover most applications run on the system, he said.

Audit uses five main language verbs – computer, select, randsamp, parastat and printset – and two seldomly used verbs – file into and indent.

"To do one retrieval, you need a minimum of three cards, a normal run would require seven to 12 cards which could handle 600 to 2,000 statements. The number of select and computer statements are limited only by the size of the compiler," Rolig said.

Brown told the workshop attendees that the most serious threat to data security is data omission, which is "due to errors and poor leadership," and this is what an audit package should watch for.

Errors are a far greater threat to data security than theft or sabotage and far more common, he said.

'Taps' Eases On-Line Program Tasks

NEW YORK – Users faced with creating on-line systems can gain an easier interface with their communications monitor through use of the Terminal Application Processing System (Taps) software from Decision Strategy Corp. (DSC), a vendor spokesman said.

With Taps applications are "completely isolated" from hardware and network considerations, he added. The package is designed to provide a number of common on-line system functions by means of tables and procedures without user programming.

Functions supported by Taps are said to include network security and control, terminal operator facilities and CRT screen building and sequencing. Full paging, data format editing and data collection and file formatting are also part of Taps.

The package also supports systems testing through a simulated on-line environment run in batch mode.

Conventionally, all the basic parts of an application are integrally embedded within the application programs. The dependencies created by this approach add "substantially" to the difficulties in coding, testing and maintaining the systems.

The series of tables utilized by Taps separates control of screens, modules, intermediate data and "the other complicated interdependencies" in an on-line system from the "real" application logic of the user's needs, the company added.

Taps is written in Cobol and is intended to be independent of the machine operating system and the communications monitor. It has been implemented on IBM equipment under IMS, CICS, Tcam and the independently developed Ducs terminal support monitors.

Versions for Interdata minicomputers and Burroughs Corp. and Univac mainframes are "being studied," the spokesman said.

The IBM version is available for $17,000 from DSC at 708 Third Ave., New York, N.Y. 10017.

'Product 3' Priced For End-User Sales

CLEVELAND – A data base management system for minicomputers, Product 3 is now available to end users for $900 in relocatable form or $1,900 in source code, according to the vendor, ELS Systems Engineering.

OEM price schedules for the system, which was announced last year [CW, May 14], remain in effect at $7,500 (in relocatable form) and $6,000 (in source code), the spokesman noted.

Product 3 is currently available "off the shelf" for all Digital Equipment Corp. PDP-11 operating systems and by special order for Interdata Inc. and Modular Computer Systems, Inc. (Modcomp) minis, he added.

The vendor is at Suite 203, 2800 Mayfield Road, Cleveland Heights, Ohio 44118.

'Data Catalogue' Accepts COPY As Trigger to Dictionary Entry

BURLINGTON, Mass. – Release 6.0 of the Data Catalogue data dictionary package from Synergetics Corp. includes extensions of the system's conversion facilities and better production for the dictionary itself, a spokesman said.

Until now the conversion facilities allowed the user, working with IBM 360/370 or Univac 1100 series equipment, to build dictionary entries directly from Cobol programs.

The extensions under Release 6.0 include automatic processing of the COPY clause, a text-editing feature and additional reports, the company noted.

Further, IBM-based users can now build their dictionary from IMS data base descriptions (DBDs) or from file descriptions in BAL programs, the spokesman said.

The text-editing feature strips prefixes from data names found in Cobol data division listings so that meaningful names are used as dictionary entries. Carryover of the prefixes would disguise, in many cases, the basic significance of specific fields of the redundancy of fields from one file to another, Synergetics said.

Password protection has been built into the new release to provide greater security for the dictionary.

On the output side, Data Catalogue Release 6.0 enables users to generate PL/1 structures comparable to Cobol data divisions from dictionary entries, the vendor said.

The package operates under all versions of IBM's DOS and OS environments, both "real" and VS, and under Univac's Exec 8. The DOS and Univac version is available on a perpetual license for $12,900. The OS version costs $14,900, the firm added from One Garfield Circle, Burlington, Mass. 01803.

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For Banks With 370s

IBM Has On-Line Account Processing

WHITE PLAINS, N.Y. — Commercial banks with large-scale IBM 370 mainframes, 3270 CRT terminals and Information Management System (IMS) software are able to do far more than conventional checking-account processing with the On-line Demand Deposit Accounting System available from IBM, a spokesman said.

Developed at the Bank of Delaware, the package provides "extensive" account profitability analysis, on-line inquiry and updating, "comprehensive" report request facilities and one-pass processing of the data base for posting, statements and standard reports.

It can be easily integrated into a Central Information File (CIF) environment, the company added.

All accounts — retail and commercial — are subject to complete profit and loss analysis once a month, and this information is available on-line if desired.

The analysis support extends to the relating of multiple accounts so that losses, service fees and other debits can be charged to a primary "parent" account, the company said.

On-Line Capabilities

The on-line capabilities of the software include updating and memo posting by 3270s, immediate update of user-selected nondollar fields and settlement of dollar entries. New account information and authorization codes can be inserted immediately, IBM continued.

In addition, the system allows users to "back out" returned checks deposited from float and availability by keying in the date posted in the routing-and-transit number. Special reports also allow users to reconstruct account daily activity on-line, the spokesman said.

Running with IMS under either OS or OS/VS, the program requires 50K of main memory for each message region and may be run in virtual. As an Installed User Program, it carries a license fee of $5,250/mo which is waived after the first 12 months.

Package Bills 3/10 User

WEST MONROE, La. — Installations based on IBM 3/10 hardware can set up and evaluate billing rates for allocation of their costs with the Computer Time and Job Accounting package, according to its vendor, Bancroft Computer Systems.

Written in RPG-II, the system allows coding and input of both machine and personnel time spent on user-specified DP tasks. Transactions may be coded according to customer/user, task performed, employee and application, along with the clock start/stop times by tasks, Bancroft added.

Passed against costing files set up by the user, the transactions trigger production of analysis reports. In addition to serving directly as the means of allocating costs back to users, these reports can also be used to help in assessing the system's performance and in scheduling activities in the future, a spokesman said.

The package can be modified to run in 12K, but was designed for a 16K disk-oriented IBM 3/10 with the RPG-II compiler and Disk Sort from IBM. The software is shipped on "approximately 2,000" 96-column cards, Bancroft noted.

Normal price of the package is $475, but an introductory price of $375 is in effect for a limited time, the company said. Bancroft can be reached through P.O. 1533, West Monroe, La. 71291.

JCL Builds Documentation

SUNNYVALE, Calif. — Computer operations and systems maintenance documentation can be created for IBM-based shops using JCL statements as input to the Docu/Mentor package, according to the vendor, C.A.P.

Procedure libraries, system catalogs, volume table of contents and sort-partitioned data set information can also be used as input, C.A.P. said, adding that formatted analysis lists, cross-references and flowcharts are available as output.

The $7,500 package runs under either OS or OS/VS and can be ordered through P.O. Box 2157, Sunnyvale, Calif. 94087.

Reports Run on PDP-11s

PALO ALTO, Calif. — The Management Aids for Planning Strategies (Maps) software from Ross Systems, Inc. provides Digital Equipment Corp. PDP-11 users with facilities for financial planning, modeling, consolidations and other tabular format reports, Ross said.

Built around a user language intended for nontechnical people, Maps creates its output from matrix descriptions of the rows and columns wanted, the vendor explained.

In addition to formatting capabilities, Maps and its language allow the user to massage data on the files in order to see the effect of a change in any of the factors making up, for example, an anticipated corporate plan; in simpler terms, it allows the user to play the "what-if" game, Ross said.

The package functions under DEC's RSTS/E environment, and users may therefore work in either batch or interactive mode at their own sites. Maps is also available on a time-sharing basis on Ross' PDP-11 here, a spokesman noted.

Written largely in Basic, the program could probably be adapted to other minis and mainframes, he acknowledged. In the current RSTS/E version, it requires 32K bytes of memory and is available for $10,000.

Charges for time-shared use of the software on the Ross hardware do not include the cost of calls into the data center here, Ross added from Suite 108, 1900 Embarcadero, Palo Alto, Calif. 94303.

'Solie' Backs Intel Installations

TORONTO — Solie, the Stack Oriented Language for Intel 8080, from Display & Decision Systems Ltd is said to have the capabilities of Fortran minus floating point.

Using Solie optimizes both execution speed and programmable read-only memory (Prom) storage required, the vendor said. Calculations use 16- and 32-bit integer add, subtract, multiply and divide instructions.

With the $480 package, a "typical" 300-statement Fortran program requires 2K bytes for interpreter code and 1K for strings and constants, the firm claimed from 80 Galaxy, Toronto, Canada, M9W 4Y8.

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'Easyspace' Reduces Disk Space Needed by 370 DOS/VS Users

CHERRY HILL, N.J. — Easyspace from Value Computing Inc. (VCI) is designed as a system enhancement for IBM 370 DOS/VS users, allowing run-time allocation of scratch work space from a pool of available space.

Space reserved for scratch files can be cut as much as 50% with this software, VCI claimed.

The pool of available scratch space used by Easyspace is common to all partitions, and a single set of partition-independent JCL statements can handle each job regardless of where it runs. Any mix of disk types and any common file type except Vsam is supported, the vendor added.

Since DOS/VS does not maintain information on availability of temporary disk space, users normally define the physical pack and placement on that pack for each job.

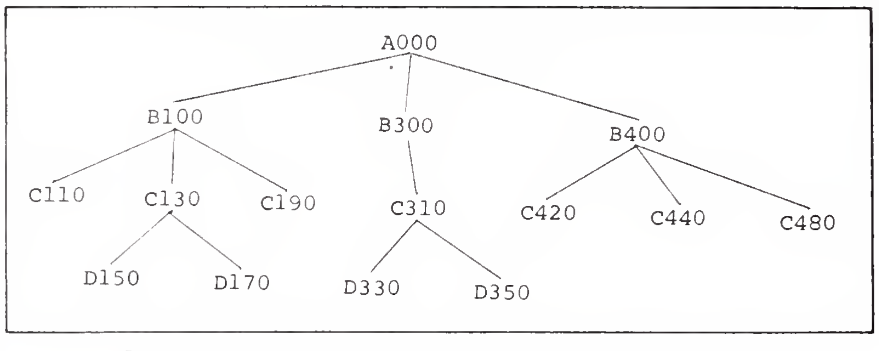
Made prior to run time, these definitions may lead to conflicts, as two or more jobs attempt to use the same space.

Under Easyspace, scratch disk files are made partition-unique at run time, therefore, conflicting assignments are eliminated. At the same time, split cylinder extents are facilitated in a way that can "significantly" reduce run time, VCI said.

Overhead is both "insignificant" and "transparent," a spokesman added.

The package is operating system release-independent and requires no changes in the user's operating system environment, he said.

Easyspace currently sells for $3,395. There is also a 12-month pay-out option. VCI added from 300 VCI Building, West Marlton Pike, Cherry Hill, N.J. 08002.



Program structure with suggested designations is shown above.

Module Designations Awkward

By Daniel Drabenstot

Special to Computerworld

Concepts and Techniques

The module-naming conventions outlined by Perry Babcock, in "Outline Form of Structure Rules Provides Essentials" [CW, Feb. 23] were tried at our installation and found to be very cumbersome, especially when the hierarchy is more than two or three levels from top to bottom. More than four digits are hard for the human mind to remember, e.g., 321423MOD.

In addition, his convention does not provide easy location of referenced modules. For example, it is not natural to find 13MOD between 121MOD and 21 MOD.

My solution to this problem is to use one alphabetic character to show the hierarchical level and a three- or four-digit number to show sequence. The entrance paragraph sequence number should always end in a zero and the exit paragraph with a nine.

The structure which Babcock showed would then look like the accompanying diagram.

It would be advisable to leave gaps in the sequence numbers, so that additional modules can be inserted as modifications are required.

The modules are located in the program listing in ascending sequence number. This eliminates the need for a sorted cross reference of paragraph names, if all modules are compiled together.

If each module is separately compiled, as they probably should be, this naming convention ensures that the module name can both show structure and be somewhat descriptive in the normal eight-character limitation for module names on system libraries.

Drabenstot is a senior analyst/programmer at CNA Insurance in Chicago.

Modular Programming Has Hidden Problems

By William O. Hedgepath

Special to Computerworld

Modular programming is one of the fastest growing DP techniques today.

It seeks to solve the major problems that plague DP managers: what to do with large, complex computer programs that have given birth to the even more complex systems; how to ease the interface between modules of a system; how to make flexible the inflexible system created from a poor design specification; and how to remove the problem imposed by the programmers who have sole-source knowledge of a poorly documented system and have left the company.

Modular systems compared with similar nonmodular systems have shown substantial savings in cost from initial system design to maintenance of the production system. However, to allow these results to imply that all programs within a system should be designed and developed modularly may have hidden problems.

In general, all application programs or systems can be classified as either scientific or commercial. A scientific system is designed primarily for computations. A commercial system is designed primarily to update files, process records and not to perform computations.

Fortran is one of many languages used for scientific models or simulations that may consist of as many as several hun-

(Continued on Page 21)

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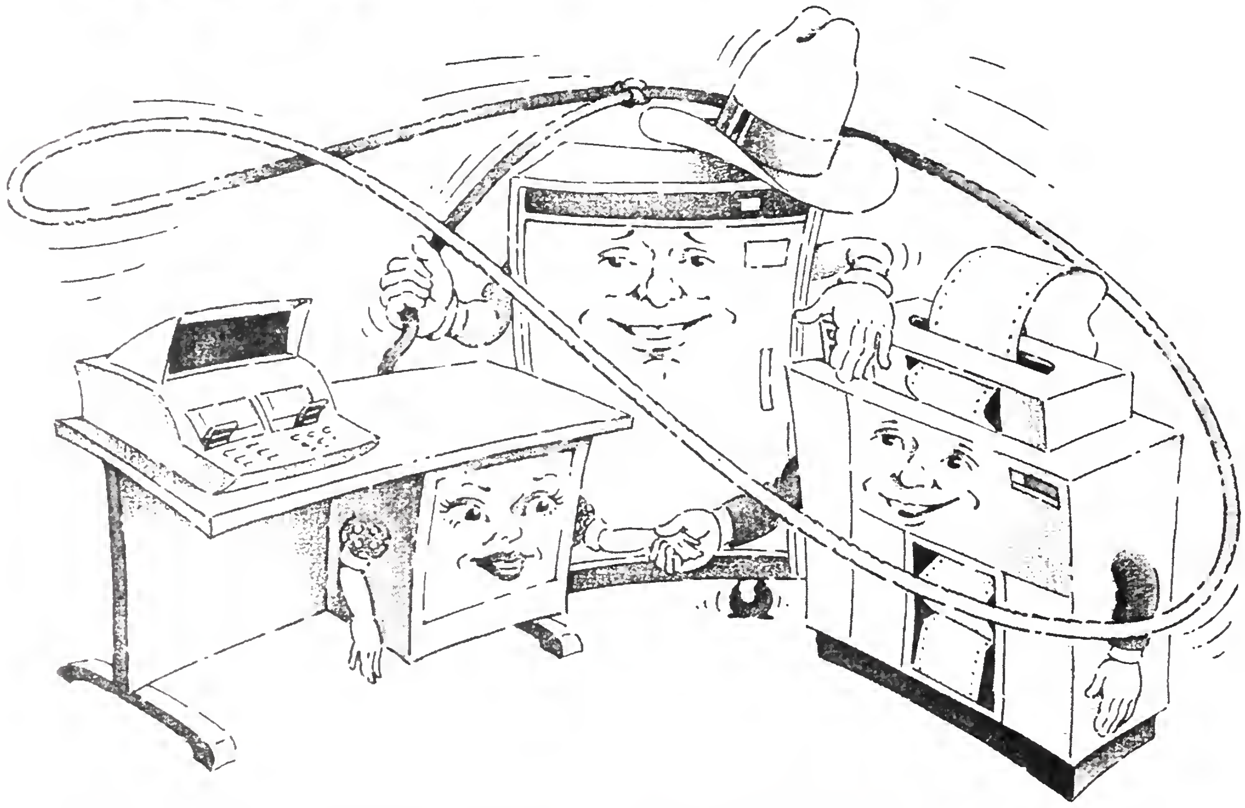

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Mini Makers Still Don't Understand End User: Lecht

By Esther Surden
Of the CW Staff

NEW YORK "Most of the mini manufacturers don't have the packages that are sold with the system," Charles Lecht, president of Advanced Computer Techniques, said at a workshop for first-time users of applications packages on small machines at the Computer Caravan here recently.

Most of the attendees were considering buying their first minicomputer and expressed interest in how to select applications packages for their systems.

"Most of the vendors haven't the foggiest idea of what an end user needs," Lecht said. It isn't a conspiracy; most of the mini makers have been supplying OEMs for years, and they don't understand the problems of an end-user shop, he explained.

There are three other sources of applications programs the user should consider, Lecht said Turnkey vendors who configure the hardware and then write the application software to fit the hardware are one, he said

Others include a company that decides to invest or develops a software package for sale under a paid arrangement with another firm, and a company that has developed a package in-house and now is trying to market it.

"Use your common sense" when looking for an application package, Lecht told the group. Find out if there are any other users of the package being sold and then go visit the installations and ask questions.

Make sure the company that is selling the package legitimately owns it, he said

"It's surprising how many companies will market a package they don't really own," he said.

"Ask if the package will do the job you want it to" do without much reformatting, Lecht advised. Also be certain of the financial stability and solvency of the company that is selling the package for maintenance and field support purposes, he said

Software can either be a product or a service Lecht said "The difference between a product and a service can be dramatic," he added.

A package that is a service must be infused into the operation and must be finished on site "If a package has to be visited frequently after delivery it's a service," Lecht said

About 80% of all application packages are services, Lecht said

Ninety percent of the applications packages in *ICP Software Directory*, Auerbach and Datapro are unusable without a great deal of "genetic matching" to the firm's needs, Lecht told the group

These listings are a good place to go to find information about the packages, but should be used after the user has exhausted the advice of friends, Lecht said

A[illegible] usual heart [illegible] been [illegible] application software [illegible] company. B[illegible] that [illegible] continued.

Also the [illegible] package from the outside [illegible] could be greater than the cost [illegible] doing one's own package, he said. [illegible] on a new application [illegible] part [illegible] operation [illegible] the operations in other parts of the [illegible].

"So while you are looking at the packages, also look at the long-term aspects," Lecht said

"The package you [illegible] can cause you to embark on a series of environmental and computational changes, each of which is inconsequential, but the sum of which is terrible," he said

However, "You really can save money if you buy with caution and care," he told the group in conclusion

Modular Programs Have Hidden Flaws

(Continued from Page 20)

dred subroutines. They are designed to manipulate a minimum of data items of some mathematical equation or concept in order to analyze that concept under different conditions, which is usually a different set of data items or an iteration process.

The design of scientific systems lends them directly to modularization, allowing overlaying capabilities of the computer, economic use of the computer's resources and flexibility for the user to expand his system easily.

Recently, publications have described how to effectively modularize commercial systems written in Cobol. Unlike scientific systems, Cobol systems process mountains of data. This data processing involves rearrangement and refinement of data for some specified and fixed report. Data processing systems have the same economic advantage as scientific systems in being modular.

Lately, many large nonmodular systems have been restructured into modular ones. And management seems happy over the results. The maintenance cost of these systems is going down and is paying for the cost to convert to modularity and to train analysts/programmers.

While modular scientific and commercial applications are profitable and less costly to maintain than before, the Cobol applications may have a problem waiting for them in the near future.

A data base management system (DBMS) can be used as a very effective generalized data processing vehicle for almost all commercial applications, such as inventory bill of material, personnel administration, stock exchange and portfolio management.

And interactive users of a DBMS can also instantly update files, produce new-product lists, restructure new systems and change output formats to please the user or customer.

Managers of commercial or business systems should take a good look at DBMS as well as modular programming concepts when considering converting their old patched-up Cobol systems to something more economical in processing time, flexibility of use, ease of maintenance cost and customer satisfaction. Converting to modular design alone now will be even more costly when converting to a DBMS a year or two later.

Modularity may not be suitable to Cobol applications as a general rule, just as a DBMS may not be a suitable replacement for Cobol applications. But together they may be a very powerful and profitable tool.

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Despite the Many Emerging Services

Users Told to Expect Few Cost/Performance Benefits

By Ronald A. Frank
Of the CW Staff

GLEN COVE, N.Y. – Data communications users have few immediate cost/performance benefits to look forward to – despite the many new network services now emerging, according to Dr. Howard Frank, president of Network Analysis Corp.

Even in the "most promising area" of satellites, there are many uncertainties; a satellite carrier will have to have a "very substantial ground network" before the typical user can start saving money, Frank said during a recent interview here.

A satellite carrier will have to configure a network of 30 to 50 groundstations before a "substantial part of the local network costs" are eliminated for data communications users, he said.

Most of the user's network costs are still in the local loop area and, while the longer haul or backbone costs have dropped, the local access costs are still high, he noted. It will be a long time before "the satellite carriers get enough penetration to make costs substantially cheaper for the user," he said.

Commenting on published reports that the IBM/Comsat/Aetna satellite network will utilize $2,000 groundstations, Frank said it may be feasible to drop the current $100,000 per station cost down to the $10,000 range within five years.

"But to go from $10,000 down to $2,000 seems more like science fiction than science," he said.

While communications hardware costs will continue to drop, communications service costs have bottomed out, Frank believes. "AT&T has met the competition and I don't think it is recovering full costs. If the Telpak type of bulk discount goes away, then every specialized carrier will raise its rates," he said.

Bell rates act as an umbrella and, when they rise, the other carriers will follow, he said.

For the next five years network users will just "have a realization of the promises of 1970 to 1975. What people think they have today, they don't really have. Packet switching and satellites and all the rest – but if you go out and try to implement a real-world network, you find it consists of leased lines.

"Maybe you can save a few dollars using an MCI [Telecommunications Corp.] line and maybe you can get some dial backup using [the Data Transmission Co.'s] dial-up instead of going through AT&T," but essentially there are not that many options, he said.

The one packet-switched common carrier now in operation, Telenet, is "rudimentary" and will not offer users a "major breakthrough for a while," he said.

"I think that we have seen everything that is going to happen in the next five years already here," Frank said, referring to network services.

Turning to the protocols and their relative constraints, Frank said some of these problems will be lessened with more widespread use of microprocessors in communications equipment.

"Within two years or so, the user will be free of link-to-link protocol limitations" simply by switching the hardware at the ends of the line, he said.

The network protocols are still very much up in the air and some of the proposals receiving the most consideration before standards agencies are not the ones that will prove the most useful in the long run, he said.

There is much discussion about distributed communications networks, but "there is not a single major operation which really uses distributed processing in the true sense of the word," Frank said. "If you are a user, you do not build a network which requires two computers [unless they are] in the same room cooperating with each other; there is no protocol built around such a concept."

Users don't like to build networks that require operations very different from the ones with which they are already familiar, he indicated.

Cost savings for network users today still boil down to the traditional approaches of network reconfiguration. This takes advantage of tariffs and efficient layout of lines using multidropped nets with concentrators and multiplexers, he said.

Only recently has "off-the-shelf" reliable software become available for the use of concentrators, he added.

Tailoring Needed

Users also must tailor their communications networks to their real requirements, Frank said. Typically users run batch and time-sharing applications as low and high priority when they really haven't studied the requirements of their problem very carefully.

"People often are paying for 10 sec turnaround for a batch application when they should really be performing the application overnight," he said.

The key to doing this analysis is studying the application rather than the network traffic pattern. "As soon as you change a network configuration, the traffic responds. If you make the network worse, the traffic goes down. And if you make the network better, the traffic goes up," he noted.

"There is no magic right now to optimize networks. It is really a grueling, tough process," Frank said.

Teletype Units Score Low on User Survey

DELRAN, N.J. – While most teleprinter terminal users operate equipment from Teletype Corp., they also rate this equipment less efficient in overall performance than other similar units. IBM, which also has a large number of users, was rated only slightly higher in a Datapro Research Corp. survey of low-speed interactive terminal users.

Among eight vendors identified as having the "most widely used" terminals, Computer Transceiver Systems, Inc. and Digital Equipment Corp. scored highest in overall performance among the users responding to the survey.

The survey drew responses from 571 users with 11,158 terminals installed.

Most-Mentioned Vendor

The vendor mentioned by the largest number of users (117) was Teletype with 4,397 terminals represented. Next was IBM with 106 users and 2,224 terminals installed.

Texas Instruments (TI) had 58 users with 392 terminals; DEC had 49 users with 283 terminals; General Electric (GE) had 45 users with 245 terminals; Anderson Jacobson had 33 users with 244 terminals; Computer Devices had 19 users with 61 terminals; and Computer Transceiver had 18 users with 55 terminals installed, the survey showed.

Time-sharing was the most widely mentioned application, with 62% of the terminals utilized for this type of operation. Inquiry/response was second in applications with 36% of the user responses.

Most of the users (45%) operated their terminals at 30 char./sec while 34% operated at 10 char./sec and 24% transmitted data at 15 char./sec, according to the survey.

Ascii Most Popular

Ascii was the most popular transmission code with 70% of the users operating in this manner. About 16% had equipment operating in Ebcdic code and 10% used Correspondence code.

As might be expected from interactive users, 69% operated on dial-up lines while 18% used private-line facilities. Most (42%) used acoustic couplers with their terminals while 23% had built-in integrated modems and 28% utilized Bell data sets.

In the area of "auxiliary features," 21% of the users had punched-tape capabilities, while 9% used cassette tapes and 8% had an answer-back capability. About 60% of the users had no extra features, the survey showed.

In overall performance, Computer Transceiver and DEC were rated at 3.6 out of a possible 4. Computer Devices, GE and TI scored 3.3; Anderson Jacobson and IBM rated 3.2, and Teletype scored 3.1, the survey showed.

The complete teleprinter terminal report is available for $10 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Wristwatch of Tomorrow: Phone, Integrated Circuits and Memory?

By a CW Staff Writer

CAMBRIDGE, Mass. – The wristwatch telephone of tomorow will be a personal transceiver with information retrieval circuits and a memory to hold a few hundred most-used numbers.

This was one of the predictions made by science fiction writer Arthur C. Clarke at a recent convocation here on communications celebrating the centennial of the telephone. The convocation was jointly sponsored by MIT and AT&T.

The portable communications unit predicted by Clarke was described as something like today's pocket calculator with data banks and information-processing circuits added.

The unit would be a constant companion serving much the same functions as a human secretary, Clarke said. The device, which he called a "Minisec," would provide more and more services until it finally developed "a personality of its own," he said.

The writer said communications satellites can unite mankind. While the U.S. was created with the railroad and the electric telegraph a century ago, jet planes and communications satellites are performing the same important functions today on a global scale, Clarke said.

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CDC Says 2550 Network System Boosts CPU Efficiency

MINNEAPOLIS – A network communications system that is said to remove protocol handling from the CPU, speed two-way data transfer and increase computer system efficiency has been introduced by Control Data Corp. (CDC).

The 2550 communications system was designed for users of the firm's medium-scale 3170, 3300 and 3500 computers with CDC's Master operating system and the Message Control System (MCS) III Version 1.5, CDC said.

The system includes a 2550-2 host communications processor, a communications coupler, a control model and software.

Principal advantages, according to the company, are reduction of central memory requirements and elimination of the central processor overhead associated with communications-processing functions.

A typical system servicing 10 to 30 terminals could realize an increase in central memory available to support additional batch processing and user applications programs by 1,500 to 14,000 24-bit words, without increasing central memory size, CDC claimed.

The 2550-2, also used with CDC's Cyber 170 computers, features 32K 16-bit words of 600 nsec main memory and controls from two to 32 synchronous and asynchronous communications lines, it said.

Continuous data throughput capacity is said to be rated at 10K char./sec.

Memory and communications capabilities of the host processor can be expanded to 65K words and 128 lines respectively, CDC added.

Physical linkage of the host computer and communications processor is accomplished by the Model 10344-1 communications coupler – a set of circuit boards and a termination panel housed in the 2550-2 cabinet. The coupler includes three transmission circuits for data exchange, supervision and control, the company said.

In addition, a direct memory access port handles data transfer between coupler and the 2550 processor memory, initiated either by the 3000 series host computer or the communications processor.

Data is transferred in single 8-bit Ascii characters or two 6-bit BCD characters per 12-bit coupler word, CDC said.

Logic to establish terminal line connections and to control modems, communications line adapters and data transmission to and from connected terminals is reportedly contained in a series of standard terminal interface programs (TIP).

These programs are part of the CDC 2550 Controlware Package and support the Teletype TIP (Mode 3 protocol), CDC 713 and Teletype models 33, 35, 37 and 38 terminals.

The programs also support the CDC TIP (Mode 4 protocol), CDC 711, 714 and 730 series terminals and CDC 200 user terminal (BCD/Ascii), the company said.

Other functions, governed by the Model 10344-2 control module, include system monitoring and initialization.

Purchase price for the hardware components in the 2550 system are $55,650 for the 2550-2 host communication processor and $3,938 for the 10344-1 communication coupler; the 10344-2 control module costs $3,855.

Maintenance costs are $531/mo and $17/mo for the host processor and coupler respectively. The 10344-2 control module requires a one-time installation charge of $535.

Charges for the required communications control module support software under the company's Master 4 operating system include a $350 initial fee and a $110/mo royalty. The software license is available for a one-time charge of $3,650.

Deliveries of all hardware and software products are scheduled for the fourth quarter from the company in Minneapolis, Minn. 55440.

Xerox Typing System Gets Communications

DALLAS – Xerox Corp. has introduced an enhancement for its Model 800 typing system that sends and receives data over dial-up telephone lines at speeds up to 120 char./sec, the company said.

The Xerox 800 communicating typing system also communicates directly with computers as well as with a number of word-processing systems, the company said.

The communicating 800 system is said to offer an alternative to mail service, particularly when utilizing low-cost evening or night telephone rates.

Xerox 800 Communicating System

The unit uses Bell 202S or 103A3 modems or their equivalents, a spokesman said. Receiving units can operate unattended, with tape cassettes able to accommodate more than 20 pages of double-spaced text, he added.

These cassettes can be played back on the receiving typing system or on a standard 800 typing system, he said.

Like the standard 800 system, the communicating 800 also types out copy at up to 350 word/min, he added.

The 800 products use a print wheel that is electronically controlled, instead of a mechanically controlled ball or type bar.

The communicating 800 system is being offered in configurations with single or dual magnetic tape, the company said.

Leasing prices range from $290- to $390/mo; purchase price is $13,700 for the single-tape version and $14,380 for the dual-tape version, Xerox said from 701 S. Aviation Blvd., El Segundo, Calif. 90245.

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Adds Preprogrammed Terminal Based on Dual Micros

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (Adds) has introduced a dual microprocessor-based, communications-oriented CRT terminal.

The System 70 is preprogrammed with a terminal control language that allows the operator to address the terminal using standard English commands, Adds said.

The unit's intelligence can be used to edit data input, manipulate data files and control printer output, according to the company.

The basic System 70 workstation consists of a CRT screen and keyboard; an IBM 3740-compatible diskette capable of storing 242K characters, a communications interface; and two microprocessors with 20K random-access memory (RAM).

Total memory available with the system ranges from 32K to 48K of RAM, according to a spokesman. Ascii and Ebcdic codes are supported for speeds up to 9,600 bit/sec, he added.

Options include an interface compatible with IBM 3780 protocol; point-to-point and dial-up capabilities, and a 300 line/min printer.

The CRT screen displays 1,920 characters in a 24-line, 80 char./line format in reverse video, blinking, underlining and half-intensity effects, the spokesman said.

Color-Coded Keyboard

A keyboard with color-coded function pads separate from the alphanumeric keyboard can be locked to maintain on-line security, he added.

The unit is said to provide field-oriented detection checks against errors and does not require operator supervision to perform certain arithmetic and logic operation and file manipulations.

The system can be used for inquiry/response conversations and batch job transfers as well as source data entry. It can be controlled from a CPU to allow interrogations and batch transmission during off-hours, the company noted.

The basic System 70 with 20K RAM is priced at $8,295, the spokesman said from 100 Marcus Blvd., Hauppauge, N.Y. 11787.

Railroads Combine Networks To Transmit Waybill Information

OMAHA, Neb. — Two major railroads have combined their communications networks to facilitate the gathering of freight information. Data on freight waybills is being transmitted between the two networks.

The communications hookup between Union Pacific's Complete Operating Information (Coin) system and Southern Pacific (SP) Railroad's Total Operations Processing System (Tops) has been in operation since January.

Advanced waybill information for about 85% of all freight cars interchanged by the two railroads at Ogden, Utah, Portland, Ore. and Los Angeles is now being transmitted automatically from one computer to another.

The waybill information, which moves with the load on the freight cars, contains a description of contents, including weight, and identification of consignee and consignor.

The data is transmitted along microwave networks, which the railroads were using before Coin and Tops were connected, and relayed here to Coin's IBM 370/155 mainframe and to SP's San Francisco headquarters' mainframe.

Information is sent between the two railroads using IBM 2780 line protocols and IBM 3705 front ends operating at 2,400 bit/sec.

Door to Greater Exchange

The linking of the two railroads' information systems opens the door for a much wider range of direct data exchange among railroads such as accounting and revenue information and the total number of cars destined to be in a train to plan power and cruise speeds, a spokesman said.

The microwave link permits waybill information on interchange traffic entered into one system to be automatically transmitted to the other system.

The same record is stored in both Coin and Tops, eliminating the need for a duplicate operation of punching waybill information into a second computer system, on the one hand, and providing advance planning information on the other.

A similar exchange of data theoretically could be carried on between all railroads in the country through the Association of American Railroads' Train II computer system, according to officials of both railroads.

An ultimate goal of the railroads is the one-time, one-source capture of data which both railroads use, eliminating the possibility of human error caused by repeated entries into different computer systems, the officials said.

Lower Case Feature Available for ADM-3

ANAHEIM, Calif. — Lear Siegler, Inc. has added an option to its ADM-3 dumb terminal which enables lower case characters to be displayed on the video screen.

The lower case feature can be added at the factory or in the field by a service representative by inserting three integrated circuits (IC) into built-in sockets on the terminal, Lear said.

One IC is a custom-designed, 24-pin read-only memory and the other two are 16-pin ICs, the firm added.

The ADM-3 uses a 5 by 7 dot matrix which normally displays upper case letters only. The lower case feature is obtained by shifting the nondescending characters up one line, which makes upper case letters straddle the lower case characters, the company explained.

The ADM-3 terminal is priced at $995 and the lower-case option costs an additional $100, a spokesman said from 714 N. Brookhurst St., Anaheim, Calif. 92803.

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A guide through the Hardware Jungle

MARCH 29, 1976

A Computerworld Special Report

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This Special Report was prepared under the direction of E. Drake Lundell Jr.

Optimal Multiprogramming Ups Firm's 370 Capability

By Peter A. Gallantest

Special to Computerworld

LIVERPOOL, N.Y. — We at Pneumo Dynamics Corp. have increased the capability of our IBM 370/155-2 by operating at a more optimal multiprogramming level.

At Pneumo, the computer system workload and cost have increased sharply during the last few years. Major new applications are scheduled for production in the near future.

To determine what could be done to add the workload with minimum added cost, a performance evaluation project was initiated.

After three months of measurement and analysis, a week's work, which would have required 455 elapsed hours to complete before the improvement, was completed in 350 elapsed hours afterwards.

One job which is active in the computer for one hour adds one elapsed hour to the total. Should five jobs be simultaneously and continuously active during an hour period, five elapsed hours would be added to the total.

The CPU-busy time was reduced from 94.6% to 88.2%, and the turnaround time to the users was decreased. This was accomplished without adding hardware or software.

An evaluation study of computer utilization was developed for the 155 with 1.5M bytes running VS/1, using three measuring tools: IBM's PT software monitor, SMF data reduced with the Johnson accounting package and the CICS Analyzer.

Study of the CPU, channels, paging device and secondary-storage disk utilization showed the CPU was the limiting resource by a substantial margin. The results illustrated in Figure 1 focus on the CPU-busy measurements made with a software monitor.

Figure 1 identifies the allocation of the CPU resource over a typical two-shift work day. Some interesting phenomena can be observed.

For one thing, total CPU utilization exceeded 95% from 10:00 a.m. until 11:00 p.m. This is extremely high utilization. There were times, in fact, when utilization reached 100%.

Pneumo set a criteria wherein the load factor should ideally not exceed 75% for any extended period. The CPU utilization of the teleprocessing application is shown by the dashed line.

Also, the average utilization was 20%, with peaks of about 40% in about mid-morning and late afternoon, when all users in all time zones are busiest. Figure 2 illustrates the utilization by partition.

A job can run in each partition. Therefore, with the seven partitions shown (P0-P6), a transaction can be processed in P0, while up to six other jobs can be simultaneously active in P1 to P6.

Users in the last three partitions (P4, P5 and P6) are able to get CPU time only when the higher priority partitions are not busy.

This pent-up demand was evidenced by their sharp increase in utilization between 3:00 p.m. and 5:00 p.m., when the demand in the three higher priority partitions was less.

The seven-partition environment with a CICS real-time application in P0 (with dynamic dispatching supposedly providing optimum use of CPU and I/O resources in the P3-P6 time slice group) produced a workload profile from SMF reflecting an average of 92 elapsed hours of total work during a two-shift, 18-hour day, with 9.2 measured problem program CPU hours per day.

Main storage was not considered a factor because there was no paging (i.e., at most, 1 to 2 page/sec) with absolutely no deactivation or apparent degradation in the lower priority partitions.

As the performance evaluation continued, the issues of useful work being done within the partition profiles and a saturated CPU without paging appeared, at first, very confounding.

The *IBM Systems Journal* said "a saturated memory is not necessarily a performance bottleneck. If paging is moderate, and the CPU is fully utilized, then main storage capacity is adequate and will have to be increased only after a more powerful CPU is installed."

A more powerful CPU would have been the remedy, if one needed this advice.

Up to this point, we had never questioned the concept of providing each user (in a remote-job-entry [RJE] environment) his own partition.

If we were to take the advice of the computer vendor, we would adopt all users' desires as firm objectives and then try to convince everyone (including corporate management) that the resulting higher costs for a new system were justified.

Another option we discovered was to ask some very fundamental questions about our job mix, and came up with the suggestion to improve performance by reducing the level of multiprogramming.

During the week of 1/19/76 to 1/23/76, Pneumo changed the partition class definitions to effectively merge the three lowest priority partitions representing three users, into the second highest priority partition, P1. This reduced the maximum level of multiprogramming from seven to five.

Users in Pneumo's remote environment would be responsible for their own job queue, so the consolidated partition redefinition would appear transparent to them.

The trade-off considerations were that a user may have to wait longer for a job to initiate, but, when it did, it would run in much less time.

Pneumo's criteria for service to each user was measured by the equation: Turn-around time = elapsed time + reader-queue time.

(Reader queue time is the elapsed time between the arrival of a job from a remote terminal to the start of actual processing of that job.)

Each user was satisfied with his service, as it became apparent that what each gave up in longer reader queue time was more than made up by reduced job elapsed time.

During the initial performance evaluation, we observed that 92 elapsed hours were required to do all the work of Pneumo division users per day.

Indeed, this is what the RJE user perceives as his resource requirement. In Figure 3, the results of a control week, 1/12/76 to 1/16/76, in which each user had his own partition are presented alongside that of the test week, 1/19/76 to 1/23/76, wherein the three users in P4, P5 and P6 all shared P1.

The results and conclusions were astounding. The statistics and graphic variances speak for themselves.

- The control week (1/12/76 to 1/16/76) with seven levels of multiprogramming required 455 elapsed hours to do all of Pneumo's work, averaging 91 hours per day.
- The test week (1/19/76 to 1/23/76) with five levels of multiprogramming required 350 elapsed hours, averaging 70 hours per day, to process an equivalent workload.
- This net reduction of 105 elapsed hours, approximately 21 hours per day, was further reinforced by a corollary evaluation of the three users who shared P1.

(Continued on Page S/10)

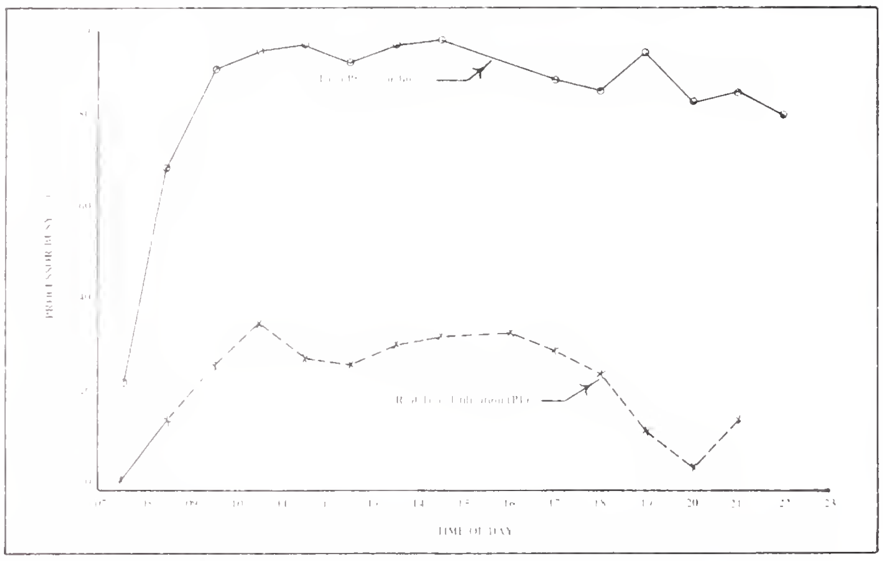

Figure 1. Hourly Processor Utilization (12/05/75).

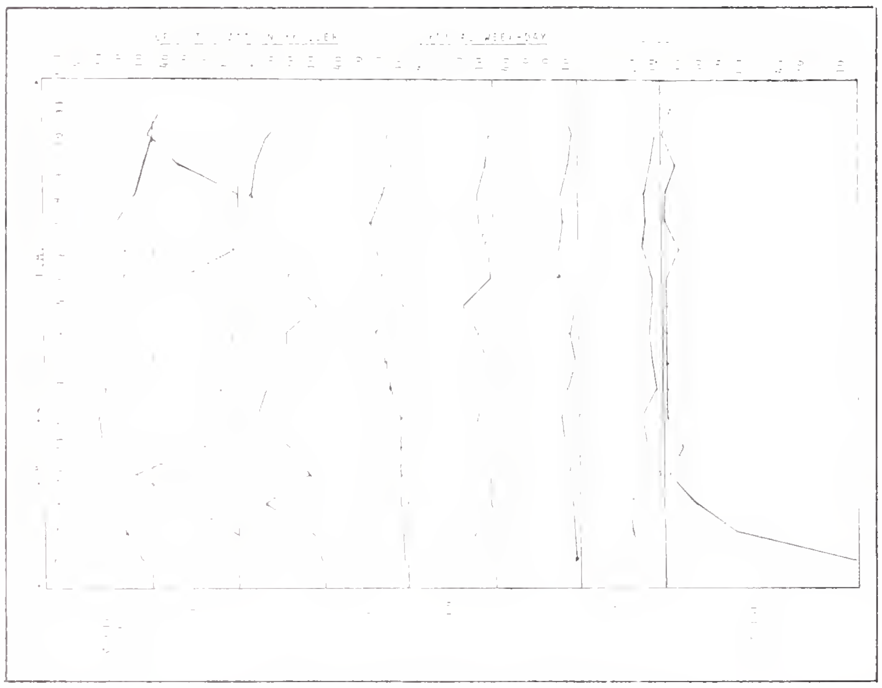

Figure 2. CPU Utilization by Partitions.

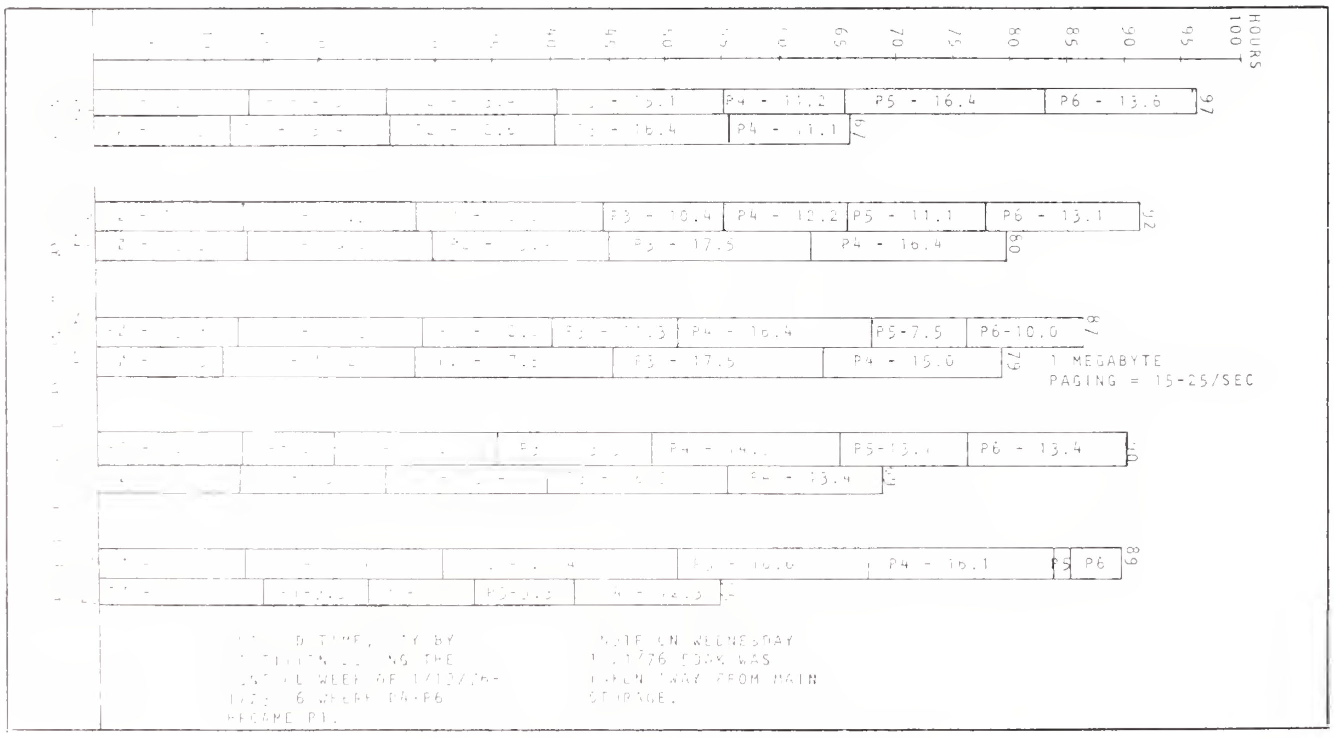

Figure 3. Computer Performance Evaluation Study.

Valve Manufacturer Finds

Switch to RJE Doubles DP Capacity With No Cost Rise

BALA CYNWYD, Pa. – By switching from stand-alone DP facilities to a remote job-entry (RJE) network connecting two plants and a foundry, an industrial valve manufacturer headquartered here doubled its DP capacity without increasing costs.

Walworth Co., which makes steel and bronze valves for energy markets, nuclear power plants and the petrochemical industry, among others, then engineered a second upgrade of its network, gaining 40% more throughput for 20% more money.

Long a believer in obtaining computer equipment from third-party leasing firms, Walworth began its data center operations here in 1971 with a 128K IBM 360/40, IBM 2314 disks and IBM 2401 tapes leased from Boothe Computer Corp., according to F. Arthur Rogers, the company's director of management information systems.

At that time, the operating system was DOS; the spooler was Grasp; and the system served one RJE plant in Greensburg, Pa. with an IBM 2701 communications controller talking to two IBM 2780 terminals.

The long-range Walworth plan called for connecting all its plants on an RJE basis, Rogers said. In addition to its headquarters here and the plant in Greensburg, the company also has plants in Braintree, Mass. and Linden, N.J., as well as foundries in Columbus, Ohio; Kewanee, Ill. and Elizabeth, N.J.

The first phase of Walworth's overall upgrade of its DP operations, which resulted in doubled capacity without budget increases, involved the installation of RJE equipment at the Braintree and Linden plants and the Columbus foundry.

Rogers noted there was already a Honeywell 2020 CPU in Braintree and a unit record shop in Linden, but nothing in Columbus.

With the assistance of a representative from Boothe, Rogers approached this network expansion first by incorporating Paradyne Corp. PIX equipment which permitted the use of high-speed I/O sets at the remote locations. This allowed the firm to remove all the costly communications gear with its attendant overhead expense, he said.

A second phase of the expansion stemmed from the use of an Edos software package from the Computer Software Co. which effectively doubled the partition availability of the 360/40, according to Rogers.

Taken together, the PIX equipment and the Edos software permitted Walworth to bring up the other three plants for about the same amount of money the company had been spending to support a single DP center.

While the upgrade was taking place, Rogers also had to move the data center to another location in Bala Cynwyd. Both these opeations took just six weeks.

Eventually, however, "with so many users on the system, I started to feel a strain," Rogers said. In addition, the company was beginning order entry, inventory control and Materials Requirements Planning (MRP) applications. A second upgrade was accordingly begun.

Walworth initiated this upgrade by expanding the 360/40 memory to 256K, bringing in another tape drive and three more spindles of California Computer Products, Inc. (Calcomp) disk drives and adding an IBM 360/30 with four IBM 2311s to handle the spooling task.

The two CPUs were technically linked through the 2311 control unit, Rogers said.

The dual CPU setup was made possible by a software package called Edos Gemini, he said. The package permits one CPU (in this case, the 360/30) to act as the support processor providing unit record I/O handling and scheduling for the main processor (the 360/40).

Freed from the I/O and systems overhead, the 360/40 was automatically scheduled by the 360/30 to optimize the total hardware resources available, he added.

Just last fall, Walworth completed this second upgrade by replacing the 360/30 and four

(Continued on Page S/12)

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Users Should Encourage Use of Cost-Effective Media

By John Price Rudy

Special to Computerworld

At first glance, magnetic tapes appear to be an inexpensive way to store data. When bought in volume, 2,400 foot reels can cost as little as $9 apiece.

Unfortunately, the initial price is only the tip of the iceberg. Tape costs can actually reach $20 to $25 per year per tape.

A data center with 20,000 reels may require three or more tape librarians plus an operations group to fetch, mount, scratch, label and otherwise care for these tapes.

With a steady flow of new applications, it is not uncommon for a tape library to grow at a rate of 15% to 20% per year. Unfortunately, the data center has a fixed amount of space. What can be done?

- Encourage a switchover from tape to disk (or archive to scratch) by a pricing mechanism.
- Squeeze more tapes into the existing floor space. There are a number of products on the market which place tape racks on tracks and reduce the amount of aisle space needed.

We received a recent proposal which showed how to increase our storage of 1,000 reels per 55 square feet by nearly 100%.

Of course to obtain the higher density there is some sacrifice in immediate tape availability.

- Institute a variety of procedures which make it cost-effective (both for the data center and the user) to switch from tapes.

A recent study I performed using SMF data shows that most tape data sets are quite small. Three types of tapes were studied: permanent files, tapes for postprocessing (microfiche or OS tape-to-print (OSTP)) and temporary holds (typically for restarts).

Surprisingly, all three followed similar patterns (see Figure 1). There were approximately 4,300 output tapes generated per week. Their pattern is shown in Figure 2.

Permanent Files

Permanent files fall into two categories: master files with some specified retention (usually three or more generations) and archival, such as Internal Revenue Service records or different versions of bills of material.

There appears to be no way to differentiate between the two using the raw data.

If all the master files of under 50,000 bytes were placed onto disk as generation data groups, they would fill approximately one 3330 Model 11, assuming three generations of each data set plus an additional 30% allocation for growth and the inefficiencies inherent in less than full-track blocking. Averages may be deceptive, particularly since some of the data sets may be from test runs.

As each data set is placed onto the disk, the SPACE parameter must be adequate for the maximum size and RLSE must be specified to assure that unneeded SPACE is released.

By allocating by track rather than cylinder, less space is wasted. Fragmentation will soon occur, and the disk must be periodically reorganized. It might be wise to investigate ways of keeping the different generations of a file on seperate packs.

These files must be controlled centrally, rather than by the individual customer or programmer. Good backup procedures demand a tape backup of any disk file, even those used sequentially in a batch environment. (Of course the availability of the file on disk may permit additional uses of it.)

If each file were individually backed up, there would be no

(Continued on Page S/10)

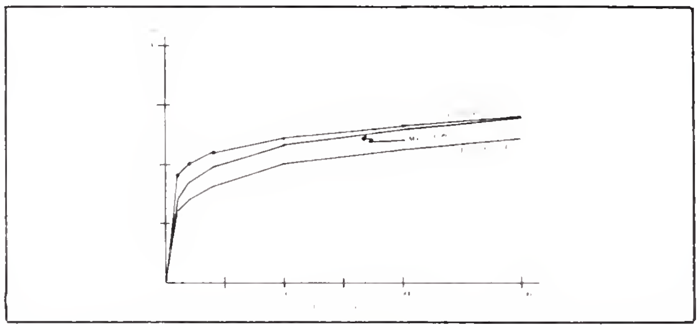

Figure 1. File Size by Type. Note that 50% of the master files are under 250K bytes. Also, 55% of the postprocessed files are under 1M bytes.

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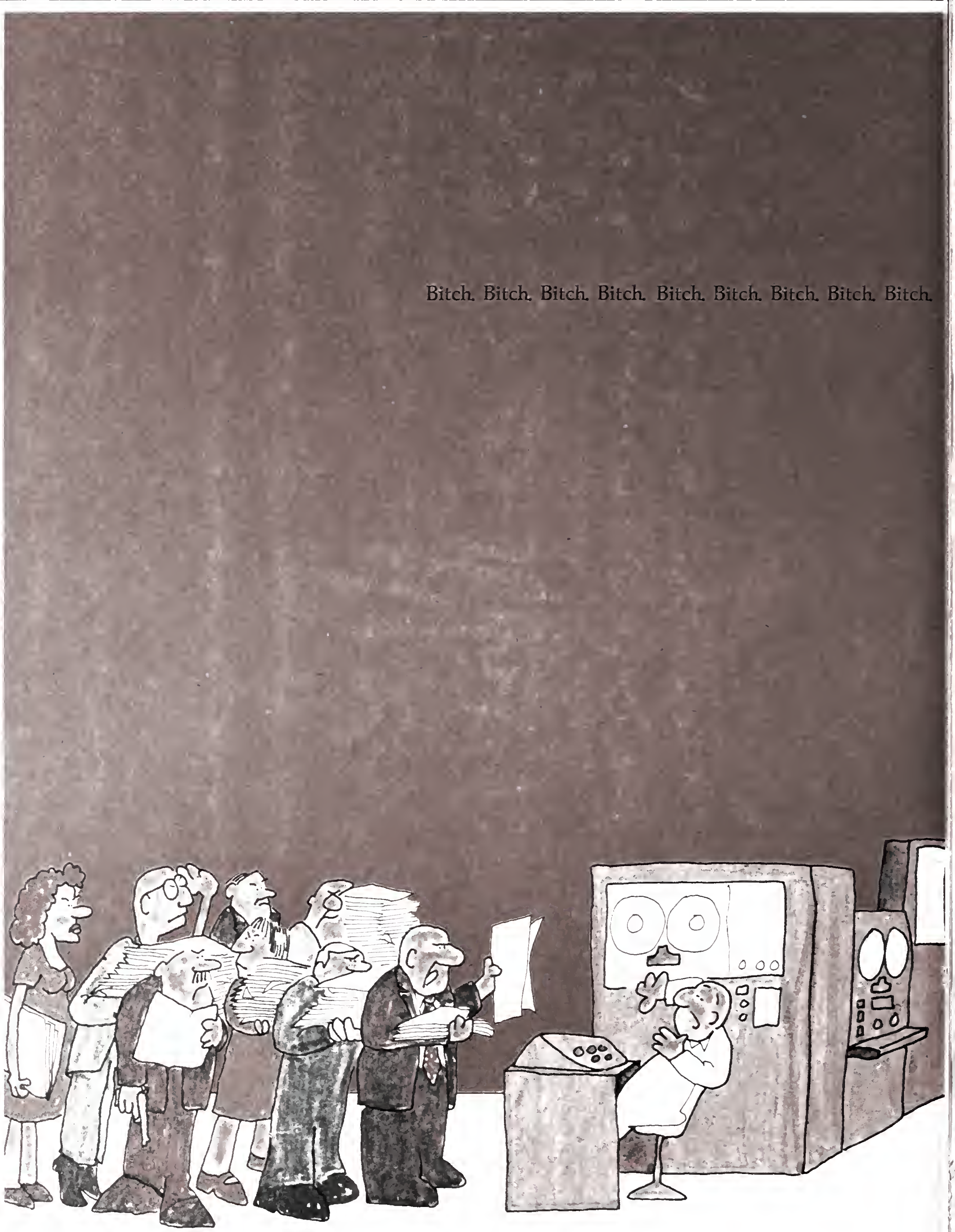
Bitch. Bitch. Bitch. Bitch. Bitch. Bitch. Bitch. Bitch. Bitch.

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Independent Drives Added

Downgrade to 360 Saves Insurance Firm $8,000/Mo

By Mal Stiefel
Special to Computerworld

LOS ANGELES – Mission Equities Corp., a local insurance company, is saving $8,000 a month since it switched from an all-IBM 370/135 system to a 360/65 with more core and Itel Corp. disk drives and tape drives.

The configuration operates under Itel's Release 30 of DOS/VS, which allows the user to hook 370 peripherals to a 360.

The move was made last October, after Mission Equities decided against using IBM's DL/I data base management system in its planned premium and claims system.

IBM told the firm additional hardware would be needed to support DL/I on the 370/135 – 512K of core, four to six more 3440 disk drives and four more 3420 tape drives.

At that time, the installation included 192K of core, four 3440s and four 3420s, in addition to a 1403 printer and a 3525 card reader/punch. The system operated under DOS/VS and Power.

IBM also suggested an upgrade to a 370/158 as an alternative to beefing up the 135.

Both proposals were rejected by Mission Equities management, not only because of the costs, but because they felt DL/I wasn't yet widely used and "most pioneers have [illegible] arrows in them," according to [illegible] company spokesman R[illegible] Mittleman.

The system, purchased outright from Itel, carries 1M byte of core on the 360/65, eight Itel 7330 disk drives, seven 9-track Itel 7420 tape drives and one 7-track 7420. IBM took back the old disk and tape drives, and Itel bought the 370/135 from Mission Equities. The company also [illegible] had [illegible] Computer In[illegible] C[illegible].

Smooth Conversion

The new disk drives were [illegible] for the conversion [illegible] disk contents. In- [illegible] and [illegible] 360/65 [illegible] later as the 370/1[illegible] gradually phased out.

[illegible] under Itel's DOS/VS [illegible] day, [illegible] some [illegible] time on the machine. [illegible] at the time IBM's OS [illegible] support the IMS data base management system [illegible] Mission Equities [illegible] premium and claims package.

[illegible] satisfied with Itel's [illegible] support. An operating system [illegible] uncovered during the conversion, was fixed quickly by Itel, a [illegible].

3330s Used as 2311s

The [illegible] of Mission Equities' unusual treatment of the 3330s. They are used as 2311s.

Mittleman said this mode of operation doesn't allow efficient use of the disk drives, but this drawback is offset by the convenience of not having to rewrite application programs.

He explained that the supervisor wasn't handling invalid flag conditions properly on the disks; it was branching to routines used for 3330s, not 2311s. No other difficulties were encountered after Itel made the correction.

A Better Handle

Mission Equities decided to go to a data base management system when it saw that its old tape-oriented premium and claims system had outlived its usefulness.

Different elements of the data base had different file structures. As a result, there was a good deal of redundancy in the files, so that the elements of the various files could be related to one another. Also, management found it difficult to understand clearly where it stood at a given moment.

"We needed a system that would give us a better handle on where we are and where we're going," Mittleman said. At the same time, the firm felt an on-line system was not yet justifiable [illegible] batch-oriented data base management system was [illegible].

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Worth Serious Effort by User

Goal of Negotiation Best Protection at Least Cost

By Joe Auer

Special to Computerworld

Getting the most for your hardware dollar logically starts when you acquire a given DP system.

The money and contractual protection you have left after either no negotiations or less than totally effective negotiations is nonrecoverable once you have signed a contract.

This lost opportunity can sometimes be so great that nothing done during the installed life of the system can equal its value.

It is worth the user's while, therefore, to prepare a serious negotiating effort before signing on the dotted line.

His two primary objectives in the negotiations should be to maximize contractual protection and minimize total system expenditures.

Don't worry that by being "a bad guy" in hard-nosed negotiations you will jeopardize a strong vendor relationship. Actually, in good negotiations, everyone wins.

Both sides come away with a sense of accomplishment, both parties to the contract have a stake in making it work, since the responsibilities (both financial and contractual) have been discussed and documented.

The parties to computer contracts are not individuals, but companies, organizations, governments and so on. People tend to come and go in DP, with the real parties to the contract still obligated to each other.

First let's take a look at the protection-oriented aspects of negotiations, keeping in mind that if you have adequate protection and don't need it, it's far better than needing it and not having it.

A vendor will not offer user-oriented protection. Actually, a typical vendor contract methodically disclaims everything which made you want to acquire the system in the first place.

The user should let it be known right from the start that proposals, benchmark results, software specifications and other specific claims will be included as part of the contract.

This approach has an added benefit during the equipment selection phase of the acquisition, since vendors tend to submit accurate proposals when they know they will be reflected in the contract.

The user can then base his equipment selection on "Vendor Commitable Offerings" rather than puffery.

Acquiring a computer is not an everyday occurrence. Every user, even those in very large companies, has a limited view of the types of protection available.

Users should get in touch with the user groups of the various vendors or contact fellow users to learn about the types of protection they have obtained.

There are an increasing number of books published on the subject of computer contracting, and these could be very helpful.

Obtain outside assistance from professionals in computer law, computer finance or computer negotiators. These types of services can prove to be extremely cost-justifiable.

Survey your own company's needs and develop a set of priorities. Ask for their inclusion in the contract.

You won't get any of them unless you ask. Above all, don't accept "We don't need to write that down you can trust me."

Determining Cost

The easy way to determine system cost is by buying the vendor's "package."

The vendor will normally present a price to do the job you want done – with the price sometimes, but not always, including such things as hardware, maintenance, operating software, application software, system support, education, possibly some financing vehicle and so on.

If the package meets your system and operating requirements and the price is within your budget, it is very easy for you to sign.

The hard (cost-effective) way to arrive at the price of a system is to break the whole, nice, neat, vendor-prepared package apart and negotiate each ingredient separately with each part being optimized and made to stand on its own merit vs. competitive bids.

Shop for the elements you can find elsewhere on the market: financing, applications packages, programming and systems support and so on.

When you've done a good job of breaking apart the package and reassembling it, you should be pleasantly surprised.

Outright Purchase of New Gear

There is more flexibility in purchasing new computers than most people realize. Among the many strategies you can employ is to get the vendor to commit to a purchase option arrangement on a configuration on a "rental basis."

In other words, start by asking for a rental contract on the configuration with whatever purchase option credits will be allowed, then, switch your strategy to one of purchase.

Then ask the vendor to accelerate the purchase option credits that would have accrued on a rental contract to the front end and allow you that equivalent discount.

Something many users do not realize is

(Continued on Page S/7)

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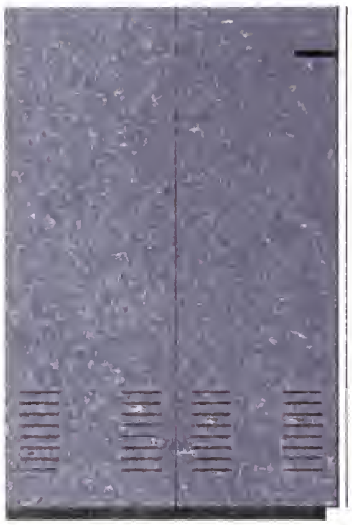

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A Valuable Opportunity

Best Protection at Least Cost Negotiating Goal

(Continued from Page S/6)

that third-party leasing companies may buy a computer from a vendor at one price, and then the vendor protects the third-party leasing company by telling the user the computer was sold at a higher price. All of the financing figures appear to be based upon the higher figure as shown to the user.

What really happens is that the leasing company buys the gear for less and applies a very high percentage rate of interest.

The user looks at what appears to be a low interest rate, but actually the rate is much higher, because the payments are based upon the stated price, rather than the actual price to the lessor.

The user should be able to purchase the machine from the vendor at the lower price. He would then be able to finance it at a reasonable percentage rate and would have much lower payments.

Rental Agreements

On a rental agreement, you can't do as much with the vendor himself on a contract as you can through alternative sources even sources that will allow you nearly as much flexibility as a vendor.

Computer vendors say they cannot discount rental prices, and, for the most part, this is fairly truthful. But, what the vendor calls a discount and what may be considered a discount in the financial sense may be two different things.

Think of the word "discount" to mean the vendor cannot rent that computer for less than a given amount of consideration. However, consideration can take many forms. Traditionally we think of consideration as being dollars; that is, "hard" dollars as opposed to "soft" dollars. In a highly competitive situation, there are allowances made on rental contracts for soft-dollar considerations, if the vendor can justify internally that these soft dollars are equal to the amount of the hard-dollar "discount."

Sometimes it is the user's responsibility to help the vendor justify these soft dollars as a substitute for hard dollars.

Soft-dollar value could include usage of your machine for benchmarks, demonstration, education of customers and training of the vendor's people.

Vendors are especially susceptible to soft-dollar proposals if there is something about the machine that you want to acquire that is unique in your geographic area.

Depreciated Gear

There are several general advantages in acquiring depreciated or used gear. If you can pick a computer where the technology curve crosses the price curve, you'll often find you can buy more actual computing capability at a lower price than with newly announced "state-of-the-art computers."

Also, on depreciated gear there is a lot of application software in existence that you can obtain for a reasonable price, probably less than you can do it yourself.

An approach to acquiring depreciated gear is to go directly to a third-party leasing company and ask it to acquire the gear for you and then lease it to you (or they may have one coming off of a lease).

You can help prevent gamesmanship between a vendor or broker and the third-party leasing company if you call in several reputable third-party leasing companies and let them know right from the start that you will do business with the one that acquires a specific configuration for you at the least cost.

If you get some competition going between third-party leasing companies on a price basis for a predetermined configuration, you've got a lot of things going for you.

Auer is president of International Computer Negotiations, Inc. in Winter Park, Fla.

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Market Growing Swiftly

Buying Used Systems an Effective Way to Cut Costs

By Albert L.C. Chu

Special to Computerworld

With cost-cutting pressures bearing down on many company budgets, used computer equipment has captured many business executives' imaginations as an effective way to stretch their DP dollars.

In 1974 an estimated $260 million worth of data processing gear, with original value exceeding $600 million, changed hands in the used computer market. That represents a 300% increase in market activity over 1970.

Industry observers are predicting a minimum 25% increase each year for the next five years. At this rate, by 1980, nearly one out of every four computer purchases will involve used equipment.

It is also apparent more and more DP managers are becoming pragmatic and hard-nosed.

Why buy used equipment? The primary reason, and often the only one, is economics. If you are using the current crop of IBM computers, you often get what you need at 5% to 35% less on the used equipment market.

Discontinued third-generation computers, such as IBM 360s or Univac Spectra 70s, typically sell for less than half their original list prices. Some IBM users still running in 1401 emulation mode have found they can backtrack to second-generation equipment and pay 6% to 8% of the original price for it.

Intangible Benefits

There are also intangible benefits. For example, an IBM 360 user whose workload expands beyond the capacity of his current computer may find it easier to acquire a slightly larger 360 to replace the existing model rather than to go to a 370 and face additional training and reprogramming. He could also shop for a second 360 of the same size to provide the additional needed capacity and obtain a backup capability as well.

There are, of course, certain hazards and disadvantages related to buying used equipment, but few are serious or unavoidable.

First of all, you may not be able to find the exact configuration you want. Second, with rare exceptions, used equipment must be purchased outright; you don't have the flexibility of leasing.

Third, if you are buying a discontinued model, you can't expect any future hardware or software enhancements from the manufacturers and obtaining adequate maintenance support for a discontinued computer may present a problem.

Finally, there is also the problem of equipment obsolescence. New and better equipment may be introduced at a low price that would negate part or all of the price advantage you gain from buying used equipment.

The bulk of the used computer trade consists of mainframe computers in the second and third generations, followed by line printers, tape drives, disk drives and teleprinters. Reconditioned unit record equipment is also quite popular.

Sources for Used Equipment

There are two major sources for used computer equipment: private owners and used computer dealers and brokers. Other, less abundant sources include the federal government, third-party leasing companies and mainframe manufacturers themselves.

Theoretically, private computer owners represent the most abundant source for used equipment. In the U.S., approximately $20 billion worth of purchased equipment is in private hands. Since such equipment is traded at least once before the end of its useful life, some $4 billion worth of privately owned computer equipment must be sold or traded each year.

In reality, however, much of this pool of equipment finds its way to the used computer dealers' warehouses. The amount of used equipment sold directly by private owners is not considered very high.

Used computer dealers and the much more numerous brokers represent the main line of the used computer trade. A dealer actually owns and maintains an inventory of used equipment, while a broker acts only as a fee-paid agent for the owner of a piece of equipment. Many dealers act as brokers from time to time.

By and large, used computer dealers tap the same sources for used equipment available to the individual user: government sources, private owners, leasing companies and so on. Some of them also buy up part or all of the inventory of a discontinued line of equipment from a manufacturer. It is estimated that there are well over 100 used equipment brokers in the U.S., but only a dozen or so dealers.

A dealer has a number of means of satisfying a buyer's needs not available to the customer from private owners. To begin with, an established dealer with a substantial inventory can often accept the buyer's trade-in or even assemble a system from its inventory to meet the buyer's exact requirements.

In addition, when a dealer can't find the right system from his inventory to meet a buyer's needs, he can always check around with other dealers to locate the right system. The dealer can also handle some of the detailed legal and shipping chores for the buyer.

Although there is furious competition among dealers, there is also a great deal of cooperation within the trade. A focal point of such cooperation is the Computer Dealers Association, a three-year-old organization, but the only one in existence for the used computer trade.

The association has some 60 members, including dealers and brokers. Besides facilitating intratrade cooperation, the association also fosters a sense of ethics and professionalism among its members, as well as in the trade in general.

Norm Burger, president of the association, said the industry's main concern is to establish a sense of trust among potential customers of used equipment dealers and brokers: "There is a fierce competi-

(Continued on Page S/9)

Guidelines Aid User Seeking Second-Hand Hardware

By Albert L.C. Chu

Special to Computerworld

Getting the most out of buying used computer equipment, especially the big-ticket items, requires a clear understanding of what you need, a lot of homework, a certain amount of bargaining skill and decisiveness. What follows is a step-by-step procedure recommended by dealers and experienced buyers for buying used hardware:

- Determine your exact requirements. Before you start looking, you should know exactly what you are looking for. That includes the mainframe model with sufficient processing capacity and any peripherals and optional hardware features required. Give yourself one or two alternative models, but specify the characteristics of each.

- Establish the maximum acceptable price. Evaluate the various alternatives for obtaining the necessary equipment (renting, leasing and purchasing from the manufacturer, third-party leasing and so on) in order to establish a reasonable maximum price you want to pay. At this stage you may want to consult a financial expert on the tax and cash-flow aspects involved in each acquisition alternative.

- Check out current price ranges of used equipment. Make preliminary contacts with used equipment dealers and brokers to check out the current price ranges for the system you are interested in. Also check advertisements in trade magazines and newspapers, newsletters and used-equipment directories. There are also a number of toll-free "hot-line" services for locating used equipment.

- Obtain management approval and funding commitment. Now that you know what you want and the approximate price you will have to pay, and provided the figures are sufficiently attractive, present your case to management to receive any necessary approval and funding commitment. Except in rare situations, you will have to purchase the used equipment.

- Contact dealers and brokers. Although there are several major sources for used computer equipment, your best bet for obtaining the right hardware is through used-equipment brokers or dealers. Get in touch with several reputable brokers and dealers and inform them of your hardware requirements and acceptable delivery dates.

You need not contact all the dealers in your area because word of your requirements will spread quickly. If one broker doesn't have what you want, he will find another one who does — and probably get a cut of the commission.

You can contact a private seller, but remember the services of a competent dealer or broker in handling all the major and minor details associated with a used equipment purchase or lease can be [illegible]. Allow [illegible] for the search and the ensuing purchase.

- Make the big [illegible]. As in [illegible] of the wise old horsetrader. Thoroughly but disinterestedly examine each proposal, ready to snap up a "find" if one should pass your way. The ability to recognize and rapidly negotiate a good buy is generally the result of homework well done.

In addition to the price, there are several other aspects to acquiring used equipment that you cannot afford to neglect. First, make sure operating software and all other documentation are available with the system.

Second, try to assess the reliability of the machines. If possible, examine the maintenance logs and look for any recurring trouble spots.

Third, and most important, make sure the machine is eligible for maintenance by the manufacturer. If the machine is not eligible for maintenance because of prolonged storage or pending engineering changes, for example, then any needed reconditioning or refurbishing must be clearly spelled out in the contract.

Buying Used Systems Helps User Cut Costs

(Continued from Page S[illegible])

tion among used equipment dealers, but we (dealers) as a group must compete with IBM, Univac and Honeywell and we have to be better to remain competitive with them.

"We want to make our customers understand we do stand behind the equipment we sell."

The Federal government possesses about 10% of all installed DP equipment and from time to time places surplus equipment on the open market. However, and fortunately for us taxpayers, there is an interagency equipment recycle program which ensures that no surplus equipment is put up for sale unless the General Services Administration fails to place it somewhere within the government.

Computer leasing firms are not as abundant a source for used hardware as they might seem. Since they usually employ very long depreciation schedules for their equipment in order to boost reported profits, few leasing firms are in a good legal position to dispose of their off-lease equipment.

Besides, IBM 360 equipment, which constitutes at least 50% of leasing companies' inventories, is currently very much in demand.

Among hardware manufacturers, Burroughs Corp., Control Data Corp. and a handful of independent peripheral makers have specific organizations which market their discontinued and off-lease equipment and equipment previously purchased by their customers.

NCR and Univac rarely engage in such remarketing efforts, and IBM does not do it at all. Honeywell doesn't list its equipment as "used." In addition, it employs a steep software licensing fee to discourage private dealing of its hardware.

If, after considering all the alternatives for acquiring new or additional equipment, you decide that the used equipment route is the way to go, there are two major things to do: look up trade publications' classified ads for offerings by private owners and contact one or several reputable dealers in your area. (There are also a number of used-equipment directories and "hot-line" used-equipment search services available.)

And, finally, be sure to allow yourself plenty of time or you are liable to rush into a deal you may regret later.

Chu is the project editor of Auerbach Data Communications Reports *and editor of* Auerbach Reporter.

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Initial Cost of Magnetic Tapes Only Tip of Iceberg

(Continued from Page S 4)

[illegible] be resolved [illegible]

[illegible]

[illegible] many files which must be saved for the length of the contract.

We found that in some cases we could piggyback 13 labor [illegible] onto one tape, saving 48 [illegible] per year or 336 tapes.

Postprocessing Files

There are a number of situations which require an output tape for postprocessing.

- Computer output microfilm (COM). Unless the COM unit can be made on-line to the computer (and [illegible] output volume prohibits this), these tapes are [illegible].
- OSTPs for special forms. There is some risk associated with running a special form output from the spool queue, though it is common for RJE users to do it. If the data set closes prior to alignment it is lost, and the job must be rerun.

Other than the obvious mechanism of "adequate" alignment lines, these data sets could be written to a permanent disk area, printed at leisure and deleted by the operator.

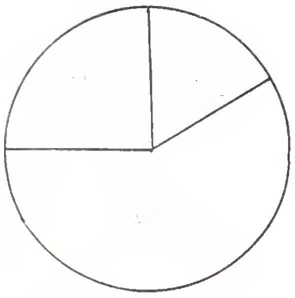

Figure 2

Our special forms jobs average 4,000 lines so this method has practical applications.

- OSTPs for large data sets. Because of space constraints on the spool pack, some limit must be set for spooled output (Sysout) data sets. RJE users are forced to place all print data sets onto the spool queue, so the local users must split up the remaining space.

We found that by increasing our limit of 20,000 Sysout lines per job to 30,000, we could free up a considerable number of tapes without significantly changing spooling allocation.

Temporary Holds

Many jobs, particularly the long ones, contain temporary tapes which may be used for recovery in case of system failure. We have found that many jobs still have the intermediate tapes used during the system development phase.

Others are holdovers from systems developed on earlier hardware configurations which were slower and less reliable.

We have also found, somewhat to our surprise, that these "extra" tapes may increase job failure because tape problems are more common than disk problems. There are a few cautions: Many jobs, particularly long ones, do need intermediate tapes for recovery, when the intermediate data sets are quite large or are highly variable in size, the tape is more convenient.

In the final analysis, the data center is at the mercy of its customers. Where cost incentive can be used, it may provide adequate motivation for efficiency, though some users are apparently indifferent to the cost, which they may merely pass on to some ultimate user.

Some programmers are merely confused by what appears to them to be a peculiar attitude toward an inexpensive media.

Rather than merely legislating any of the above, training sessions are necessary so that the programmer can understand why he is being asked to change.

Who knows, in another year or two, we may all be asked to switch back to tapes in the form of mass-storage devices.

Rudy is manager of operations research at Raytheon Co. in Andover, Mass.

Multiprogramming Change Ups Firm's 370 Capability

(Continued from Page S 2)

- During the control week, the elapsed hours profile for these three users were:

P4	70.2 elapsed hours
P5	50.1 elapsed hours
P6	52.1 elapsed hours
	172.4 TOTAL ELAPSED HOURS

During the test week, the same amount of work for all three users combined required only 71.9 hours.

With an average elapsed requirement per user of 23.9 hours per week, each user experienced a more-than-noticeable improvement in service.

The users who formerly occupied P1, P2 and P3 were now residing in P2, P3 and P4, respectively. Elapsed hours required were:

Control Week

P1 = 70.3 hours
P2 = 76.0 hours
P3 = 66.7 hours

213.0 TOTAL

Test Week

P2 = 68.4 hours
P3 = 77.2 hours
P4 = 68.2 hours

213.8 TOTAL

We were amazed to discover no increase in elapsed hours required to accomplish the equivalent workload.

On 1/21/76, seeking to analyze the effect of reduced main storage, we took 500K away from the CPU. We were able to measure a paging rate of 15 to 30 pages/sec, yet were surprised to find that all the work was accomplished in 79 hours elapsed time.

This was eight hours less than the number of hours required for the same day in the control week, 1/14/76, when seven partitions were functioning in the full main storage capacity.

Pneumo now runs five partitions as defined in the control week, in a disciplined environment. The "conventional wisdom," as we perceived it, has been thoroughly dispelled.

Total CPU utilization (the combined effect of Problem Program and System Control Program as measured by VS/1 PT) has dropped from approximately 94.6% to 88.2%. The SCP (VS/1=System Control Program) appears to burden the CPU less when dispatch priorities aren't being altered as they are executing (dynamic dispatching) and the task-switching overhead required by the two extra partitions in the control week (P5-P6) is eliminated.

Gallauresi is general manager at Pneumo.

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Jim Grisson, Compo Industries, Waltham, Mass.

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Bill Taylor, Southland Life, Dallas, Texas

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James Cranwill VP, Franklin Life, Springfield, Ill.

"We have had our G77 installed for over 7 months, and have not had a single failure."
Bob Sisinni, Thermo-King, Minneapolis, Minn.

"The G77 has answered our questions regarding data entry in that it performs the functions more economically. Our operators are very pleased with the ease and efficiency of the G77. They are especially pleased with the non-glare feature."
Earl Black, Southern Farm, Waco, Texas

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Systematic Method Improves Hardware Performance

By Saul Stimler

Special to Computerworld

"Stretching your hardware dollar" means extending the useful life of your system and having the value of the extension justify the cost of achieving the extension.

A systematic method to achieve this goal was used with a system which was processing 2,000 real-time transactions per hour and 20 background batch jobs per hour.

The real-time transaction load had been gradually increasing and at the present 2,000 transaction/hour the response time had degraded to 15 to 30 seconds.

Even without batch, the response time was unacceptable. The peak real-time load lasted for four to five hours a day, and it was necessary to process batch during this period to process the required workload.

The first thing done was to identify a specific need for action. Management stated that by improving performance so that 2,000 transactions per hour would be processed with a 5- to 8-second response time and 20 batch jobs per hour the system would be satisfactory for about nine to 12 months.

The system would be satisfactory for the next two years if it could process 3,000 transactions per hour with a 3- to 5-second response time and an average of 25 batch jobs processed per hour.

Evaluate Performance

The next step was to evaluate the performance of the current system. A performance evaluation project was initiated using three monitors. A software monitor measured CPU, channel/device utilization and paging.

A real-time analyzer provided transaction traffic, response time and CPU utilization of the real-time application.

A job-logging routine provided the data on which background batch jobs ran, when they ran and the batch job turnaround times.

The more important results are tabulated below.

Busy Hour Statistics

Transactions processed	2,000 transaction/hour
CPU time per transaction	1.4 sec
Number of transactions simultaneously active	12* (maximum)
Number of batch jobs simultaneously active	3** (maximum)
CPU busy:	
processing transactions	78%
total	85%
Average hourly paging rate	25 page/sec

General notes: No channel was more than 25% busy. A single disk was used as the paging device. The lowest priority job was deactivated frequently during the hour.***

* This means that as many as 12 levels of multiprogramming of the real-time transactions was possible. The test data showed that a level of 12 was reached frequently.

** Three background batch jobs could be multiprogrammed with the processing of transactions.

*** This was a characteristic of the virtual memory operating system. (An IBM 370/145 with OS-VS-1 was being used.)

From the measured results the bottleneck resource was the paging device. Based on past measurements, the excessive paging was caused by too little main memory area for pages.

Develop Plans

Having identified the problem, the next step was to find a solution by developing viable plans to meet performance requirements. It was clear that more memory would help. The questions were how much more memory and how much that would help.

Before ordering more memory, a performance improvement effort was started to develop meaningful answers to the questions.

Using a combination of experience, intuition and inspiration, a "guess" was made that the processing of 12 transactions simultaneously was too many for the system when the maximum simultaneous transaction-processing level was set to 4 and the paging data set was carefully distributed on three disks instead of one.

The paging rate dropped to about 8 page/sec and the CPU time per transaction dropped from 1.4 seconds to .07 seconds. Thus to process the 2,000 transaction/hour 39% of the CPU time instead of 78% was utilized. This left 39% of the CPU power for batch and future growth.

Processing the 2,000 transaction/hour and two levels of batch yielded a terminal response time between 2 and 4 seconds. To process a third level of batch multiprogramming required 128,000 bytes of additional main memory.

Because of the additional CPU available, 256,000 bytes of memory were added. Management estimated that the useful life of the system would extend about four years.

Stimler is president of Stimler Associates in Moorestown, N.J.

RJE Network Doubles Firm's DP Capacity

(Continued from Page S/3)

2311s with a second 256K 360/40 and an eight-spindle Calcomp 2314-type drive.

In addition to this dual 360/40 system, Walworth installed an IBM 2911 I/O unit and an IBM 2816 tape control unit switch.

The firm now has a backup system if one of the 360/40s goes down, Rogers explained. Walworth can switch the I/O gear to the other CPU and "limp along with two user partitions."

Rogers couldn't say precisely how much he is saving compared with going the full-price 370 route with all the bells and whistles from IBM.

Wasn't he a little apprehensive along the way? "To be perfectly honest, we had a lot of faith in our [leasing company] representative. He knew we had to have the capacity, and his proposal to bring in the second 360, the 2311s and Edos/Gemini was so financially attractive we decided to try it," Rogers said.

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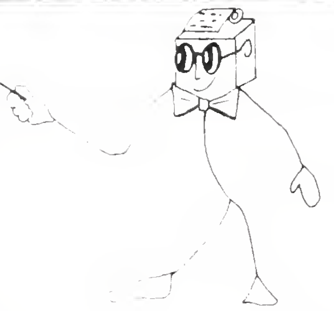

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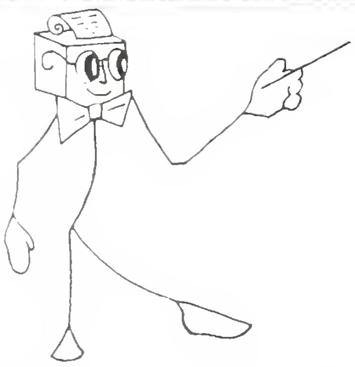

Must Consider Alternatives

Latest Machine Not Always User's Best Bet

By Arthur Mendelsohn
Special to Computerworld

Hidden away from the world outside their computer rooms, for many years insulated from budgets, DPers have always sought and cherished the very latest in machine designs.

While the desire for the newest, biggest and fastest computer system still prevails, changes in this attitude are beginning to surface.

A data processing facility comprised of mainframes, peripherals, communications, software, application programming, terminals, maintenance and conscientious people represents a major commitment by the organization which utilizes the system and pays for it.

The cycle of new computer announcements by the manufacturers, which is geared to planned obsolescence, should not dictate total compliance by the computer users. DP facilities do not always need the specific upgrade on the same timetable as the vendor's manufacturing schedule.

The traditional means of expanding the capability of a DP facility has been to increase the memory capacity, expand the peripherals in performance and number, employ additional multiprograming facilities, utilize software packages and finally obtain faster mainframes.

This upgrade, however, was usually planned by the vendor at the time of the computer system announcement. The mainframe capability, memory expansion, speed-up kits, peripheral family and next member were either part of the initial announcement or under wraps.

This historic procedure was dramatically altered by the plug-compatible suppliers. Their memory expanders and higher performance peripherals retrofitted to installed mainframes slowed down the migration to new systems.

Peripherals Boom

The competition was most beneficial to the users. The race to announce better peripherals and make them more readily available placed additional credibility on the extension of useful life.

IBM users received exotic peripherals from both IBM and the plug-compatible vendors; the non-IBMers received rental discounts or special interfaces to make similar accommodations.

For the first time, peripheral technology started to keep pace with the mainframe technology.

The utilization of large data base management systems and large operating systems often required much faster mainframes to perform the functions which seemed so readily accomplished during the planning stages. How else can one explain the extensive proliferation of the large computers?

It's crucial from the user's point of view to use large mainframes for the functions for which they are best suited and to refrain from reckless addition of applications that negate the effectiveness of the system.

Two-Edged Sword

The glamour of peripheral subsystems is another two-edged sword. When the capability of the newest peripheral subsystem on the marketplace exceeds the capability of the mainframe, the replacement of the mainframes becomes the objective.

On the other side, however, if the system can be readily enhanced when required, by utilizing the most powerful peripherals without exceeding the mainframe capability, these peripherals are worthy of serious consideration.

For example, Formation, Inc. has installed and is still maintaining over 500 3420-equivalent tape drives on RCA 3301 computer systems.

Many of these systems will still be operational for several more years, until such time as the tapes are moved to other systems.

The skeptical will question the advisability of extending the life of a system that never had disk capability. The 3301 was a very fine tape processor and most of the applications that were being performed were tape-oriented. Those applications haven't changed, only the technology, and the user should not be required to move from the optimum way of processing.

Conversely, there are times when the user must change with the technology. At 10 sites Formation has replaced communication networks employing 2311-type disks and RCA 1600s with multiple Digital Equipment Corp. PDP-11s and 3330-equivalents.

The network communicates with 3301 computers via memory-to-memory interfaces, thus providing on-line disk capability. At another installation the 3330 was placed directly on the 3301 with a buffered interface.

A front-end communication system was put on still another 3301 complex to permit higher bit/sec rate CRTs to be used and to preserve compatibility with the software. In all these situations many thousands of application programs were also preserved, permitting valuable programming resources to be dedicated to new requirements rather than redoing existing proven ones.

The use of high-performance peripherals was also extended by Formation to the RCA Spectra series. Tapes, disks and memories were made available to this now-obsoleted RCA equipment along with total system maintenance (which was also offered to the 3301 and PDP users).

One large user who had two Spectra 45s was required to purchase 60 to 70 hours of outside time per month to keep current, even with a 24-hour operation. His apparent option was either to upgrade to a more powerful machine or to objectively study his problem and look for an alternative. After examining his operational logs, there was definite indication he was tape-limited.

The incorporation of 240 kbyte/sec tape drives replacing the 120 kbyte/sec maximum originally available was the immediate solution to the problem at minimal increases in cost. This was done 2-1/2 years ago. The

(Continued on Page S/16)

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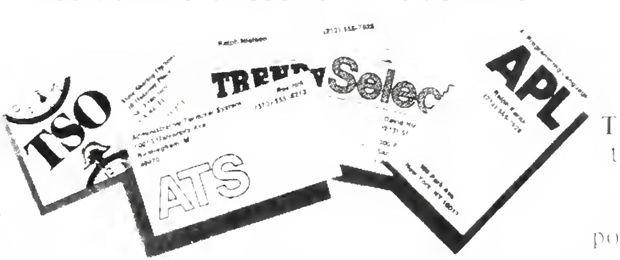

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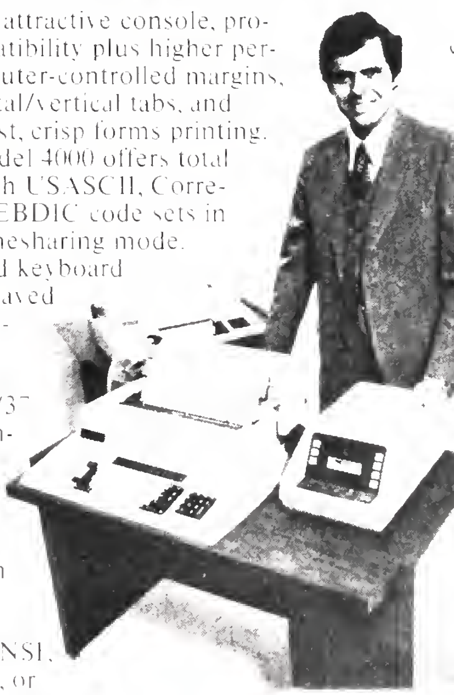

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Tapes, Disks in Bad Condition Can Affect CPU Time

By Alyn J. Gorman

Special to Computerworld

When considering ways to get the most from their hardware, many users overlook one aspect of their operations that may be costing them a significant amount of CPU and peripheral time: the condition of their magnetic tape and disk libraries.

Dirty and/or damaged tapes and disk packs result in lost processing time that can add up to a major expense.

Most of the problems users have with magnetic tape can be attributed to contamination, and most of this contamination comes from the tape itself. External sources of contamination can include dust and smoke particles, fingerprints or pieces of human hair.

Internal contamination results from normal use of the tape. Minute particles of oxide and tape backing material come loose and adhere to and build up on other parts of the tape because of its inherent static charge. Through continued use, these particles become embedded in the surface of the tape.

Dirt or damage (scratches, wrinkles, creases, etc.) on magnetic tape causes a loss of signal amplitude that results in error-recovery routines being called on to retry unsuccessful read or write operations.

The retry cycle is repeated until the signal can be read or a specified number of attempts have been made (normally 10).

Usually, if the signal loss still occurs after the retries during a write operation, the area is skipped over and the write attempt is made again on the new tape surface area. If the problem occurs when trying to read data and the retry operation fails, the condition is reported to the operator and the job trying to read the tape is halted.

In either case, CPU and peripheral time is wasted. In the case of unsuccessful tape read operations, an additional expense in personnel time is also involved, whether the user elects to simply get the job off the system, replace the original tape with a backup or recreate the data stored on the tape.

Contamination is a prime source of trouble with disks, just as it is with magnetic tape, but in this case the major source of contamination is not the disk itself. Dirt, grease and oil particles circulated by the disk drive cooling fan are the prime culprits. The air filters contained in the disk drives remove much of the debris in the air when the packs are in use, but they cannot catch it all.

Disk cartridges in many cases are subject to even more contaminants than disk packs. Most of the small computer systems using cartridge disks do not require the temperature and humidity controls the larger systems do, and in many cases their environments are a far cry from the "clean room" surroundings enjoyed by larger systems.

When contamination on a disk is encountered, it is handled differently than with tape, but the end result is the same: CPU, peripheral and personnel time wasted. The heads on a disk drive can read any signal they can detect, regardless of amplitude, but undetected signals result in the entire track being marked defective and an alternate track being assigned.

As long as the disk pack is being used after this, any reference to the original track results in the alternate track being used instead. Unfortunately, the CPU does not know that a track is defective until it tries to use it, so the process of determining the alternate track and moving the heads to it represents wasted time.

As in the case of magnetic tape, unsuccessful disk-read operations require that an alternate source of the data be found or the data be recreated.

An even more significant and costly consequence of dirt on disk surfaces is damage to the disks and/or heads — commonly referred to as "head crashes." Lost CPU, peripheral and personnel time as a result of a head crash can be measured in terms of hours or days rather than minutes or fractions of seconds.

Magnetic tape has been with us since the mid 1950s and is the most widely used input/output medium in use today. Over the years, a number of articles in the trade publications have described specific "success stories" involving tape maintenance programs.

These articles generally deal with unique, or at least unusual, situations and cite savings or loss estimates that are far beyond the realm of the average installation. (In one such article, a user with 20,000 tapes in his library estimated that he lost nearly $500,000 in system time alone in a one-year period as a result of tape errors encountered.)

Nonetheless, it's clear that a tape library in poor condition can lead to big dollar losses in any DP shop.

Many long-time users of magnetic tape simply replace their tapes after they have been in use for a certain number of years. Though straightforward, this is likely to be an expensive procedure in the long run and may really buy the users very little in the way of maintaining their libraries in good operating condition — since it is usage that has a deteriorating effect on tapes, not simply the passage of time.

Users who approach tape maintenance in this way never really know what it is costing them to use their tapes and many someday wake up to find they've got a tape library fast approaching worthlessness.

Disk Maintenance

Most disk users have taken an entirely different approach to media maintenance than have tape users. There are a number of reasons for this, including the fact that many users feel the noncontact operation of disks, as opposed to the intimate contact between the heads and medium required by tape, means the contamination factor is eliminated.

While it is true that internal contamina-

(Continued on Page S-22)

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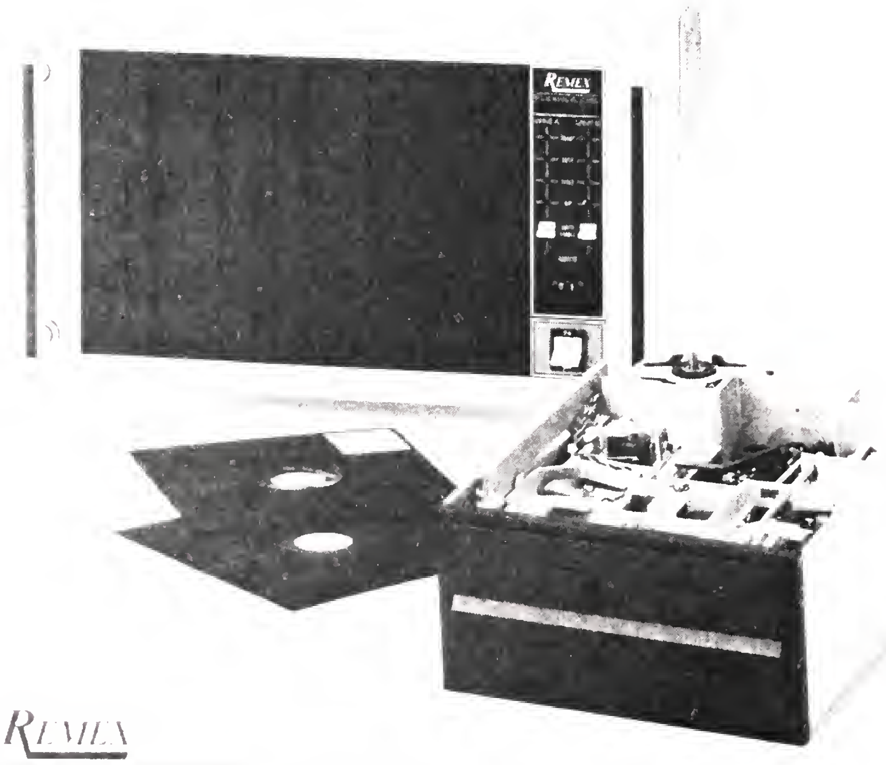

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Latest Machine Not Always User's Best Alternative

Continued from Page S/[illegible]

utilization of 320 Kbyte drives would have exceeded the data rate of the CPU.

Subsequently a buffered high-performance 3330-type disk system was provided with complete program compatibility to further decrease access time, reduce maintenance costs, provide capacity and increase reliability.

High-performance train printers, card readers, punches and communication buffers were placed on additional PDP-11s to meet the required performance and to achieve the blessings of higher quality. The intelligent use of a satellite media exchange system economically provides peripheral upgrades.

The utilization of a minicomputer to operate high-performance peripherals has the additional result of reducing mainframe loading concurrently with delaying mainframe upgrade.

The idea of a $20,000 mini operating $150,000 worth of peripherals is intriguing. The mini may even be redundant for an additional $20,000. Compare this with the cost of a small member of the 370 family as a satellite or the cost of a partition on a larger 370.

This cost/performance comparison is a major reason for the accelerating interest in the use of minis to upgrade large-scale computers. The software packages, however, are not as bountiful, but the required peripheral programs are not highly complex and can be quickly developed.

These installed peripheral subsystems are completing their fourth year on-site and they have themselves been enhanced, but at mini costs.

'Byting the Bullet'

It has been too often stated that a user should "byte the bullet" and make the necessary large system conversions. That may have been more meaningful previously, but in light of this minitechnology, a delay of five to 10 years will not hurt the user. He can save a generation.

It should be noteworthy that 158s and 168s are rarely by themselves in the computer rooms. They usually have equally powerful systems already installed or planned to be alongside them. More than the bullet is being bitten.

High-performance peripherals initially were only available to those who obtained higher performing mainframes. This requirement to upgrade mainframes has been somewhat negated by the ingenuity of the plug-compatible suppliers and the willingness of the users to move out from the umbrella of the original suppliers.

The computer manufacturer still has his options. Very high-performance peripherals which exceed the capability of the installed mainframe require a higher performance mainframe. The 6,250 bit/in. tape drive is a good example. At 200 in./sec the resulting 1.2M-byte data rate is quite capable of taxing most currently installed computers. The ability to pass huge sequential files of data is of major importance.

However, when the machines that are capable of utilizing these high-performance tapes are overloaded with functions that may be performed on smaller systems, the solution usually is to obtain another of the larger machines. The cycle starts anew.

The next major tool to beget newer and bigger machines is the software. Very generalized complex packages which eat up large chunks of computer time and their inherent inefficiencies with respect to computer utilization result in additional memory requirements and then higher performance mainframes.

Communication systems require redundancy. The large computers control the data base and therefore any front-end system that does not communicate with the data base does not result in any meaningful savings. To permit the front end to operate on the data base without utilizing the large mainframe requires a data base management system which is operational on both the front-end processor and the mainframe.

This is not practical with the existing data base systems and therefore can only be accomplished with less generalized data base systems which reflect a greater contribution by the user. The economics of this approach may be questioned and in many cases justify going along with the standard available packages and their implications.

However, for the stronger data processing entrepreneurs, it is the way. It is also lonely.

Mendelsohn is vice-president of Formation, Inc.

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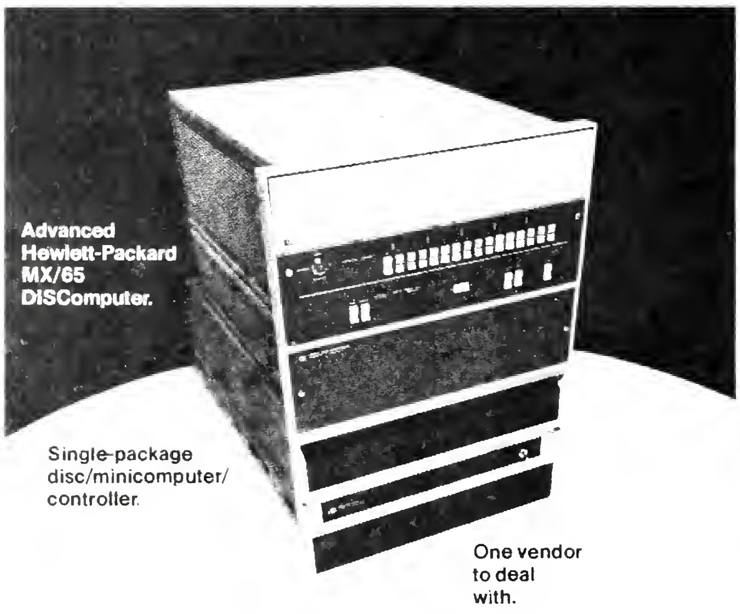
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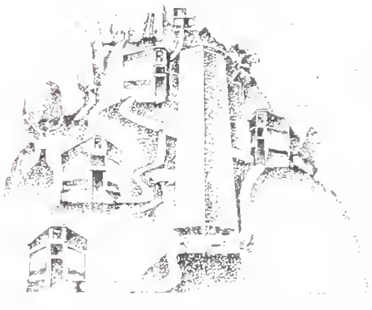
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ST. LOUIS, Mo. With more than 3,500 buy-and-sell orders being transmitted daily to the floors of the New York and American stock exchanges, A.G. Edwards, a New York brokerage house, must ensure its clients their orders are received on time – and without error.

To back up its Honeywell 6060 system – the major link between the company's 100 branches and the floor of the trading exchanges – A.G. Edwards uses a local network of five Sycor, Inc. Model 340 terminals.

The Sycor terminals are used solely as backup facilities.

While many brokerage houses use dual computing systems, Charles Zurfluh, A.G. Edwards vice-president of operations, believes the expense of a second complete system is not economically feasible.

The system is rarely down more than 15 minutes every two weeks and that is, in fact, the only time the Sycor units are used, Zurfluh said.

Worth the Rent

On those occasions when the system is down, however, the Sycor terminals are worth their rent, he said.

The orders, transmitted from Univac Uniscope CRTs in the company's branch offices, are received in St. Louis.

These orders are then routed via mechancial belts to the appropriate Sycor locations in the St. Louis order room where the orders are entered.

Checks Performed

The terminals perform checks on these orders for proper formats and sequence numbers similar to the checks made on the data by the Honeywell system.

From there the edited data, which is on the same toggle switch communications line as the mainframe, is transmitted asynchronously to Teletypes in A.G. Edwards booths on the exchange floors.

When the mainframe system problems are resolved, the two tape cassettes resident in the Model 340s are rewound and transmitted to update the files on the random-access disks.

Previous System

At one time there was no backup at all for the system, except a telephone order system in which the orders would be phoned in from the company's branch offices to St. Louis and then relayed to the eschange , Zurfluh said.

However, the orders always had to be entered twice once in New York and once to update the files in St. Louis, the latter of which had to be done as quickly as possible, often during critical periods, he said

The double keying and the speed with which it had to be accomplished increased the chances for errors, high enough as it was. "There were errors in transposition, in prices, in symbols errors that were the result of a simple misunderstanding and misinterpretation," Zurfluh said.

"Most of these errors are eliminated now, and while we have the additional expense of the Sycor terminals, they have saved us money in people time, transmission time and errors," he said.

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Efficient On-Line Storage Requires More Than DBMS

By S.C. Catania

Special to Computerworld

Within the past 20 years, there has been a dramatic decrease in the cost of on-line data storage.

Direct-access storage device (DASD) costs have dropped from over $1 dollar byte in 1955 to .001 dollar byte today. Over the same period of time the capacity of such devices has increased from 10,000 bytes to over 1 billion bytes.

In the light of such remarkable decreases in the cost of on-line storage, it would be reasonable to expect users are spending less today for on-line storage than in the past. This is not the case. Rather, users have elected to use the technological advances as a means of putting more and more data on-line.

In spite of dramatic decreases in the cost/byte of on-line storage, overall spending for such storage has increased tremendously.

To assist in managing their massive amounts of on-line data, users have turned increasingly toward data base management systems (DBMS) — and wisely so. However, although a DBMS is a necessary condition for effective management of on-line storage, it is not a sufficient one.

Typically, the objectives of using a DBMS are to:

- Provide a framework in which applications development can be standardized.
- Isolate programs for data.
- Isolate programs which are sharing stored data from each other.
- Eliminate the storing and maintaining of redundant data.
- Centralize data maintenance.

Many who are familiar with DBMS and on-line storage have come to realize that the DBMS alone (accessing techniques, I/O calls and the control software) cannot meet the objectives and will not result in effective storage management.

As a matter of fact, if one were to install the hardware, install the DBMS (software) and turn the programming staff loose, it could lead to chaos. More is needed if the money spent for on-line storage is not to be largely wasted.

Necessary Ingredient

The ingredient necessary to make it all work is the data base manager or data base administrator. This person or function should be given the broad responsibility of using on-line storage effectively and efficiently to the company's best advantage.

A detailed delineation of the types of specific responsibilities he should have are:

- Standards development, definition and enforcement, including data structures allowed, accessing techniques which can be used, I/O operations/calls which can be used and documentation which must exist for all programs accessing the data base.
- Data base design, which means the administrator would assist applications development personnel in designing data bases, including structures, contents, access methods and processing techniques. He would also approve all data base design and program processing against the data base.
- Checkpoint/restart techniques, data base integrity, and audit criteria, including approval of the restart capabilities of all long-running programs.
- Documentation maintenance, including data element registry and cross-reference data showing relationships between programs, transactions and data bases.
- Backup procedures definition, including data bases to be backed up, frequency of backup and retention of data (on-site, off-site), along with recovery procedures to be followed in restoring data bases and developing and maintaining tools necessary to restore data bases.
- DASD management, including monitoring space usage, gathering space requirements and projecting future needs for a one- to two-year period and updating quarterly.
- Monitoring data base performance, reorganizing data bases, reallocating data bases, redesigning where needed and assisting application development personnel in resolving all data base-related problems.
- Education, including in-house seminars on design techniques and standards and literature dissemination dealing with new releases of the DBMS, new standards to be employed and new cpabilities available to the programming staff.

Few Have Responsibilities

There seems to be an almost universal trend in today's data processing organizations of having a data base manager or administrator, and this is desirable. Unfortunately, however, few of the managers or administrators have the broad responsibilities noted above.

Most have their responsibilities limited to backup/recovery and DASD management functions. When this has been done, the administrator's role is reduced to one of making existing applications execute as efficiently as possible. He plays no part in the design of applications. In this environment he can often only make the best of a bad situation.

Many problems and limitations have already been designed into the application; and the data base administrator with the reduced charter can actually accomplish very little.

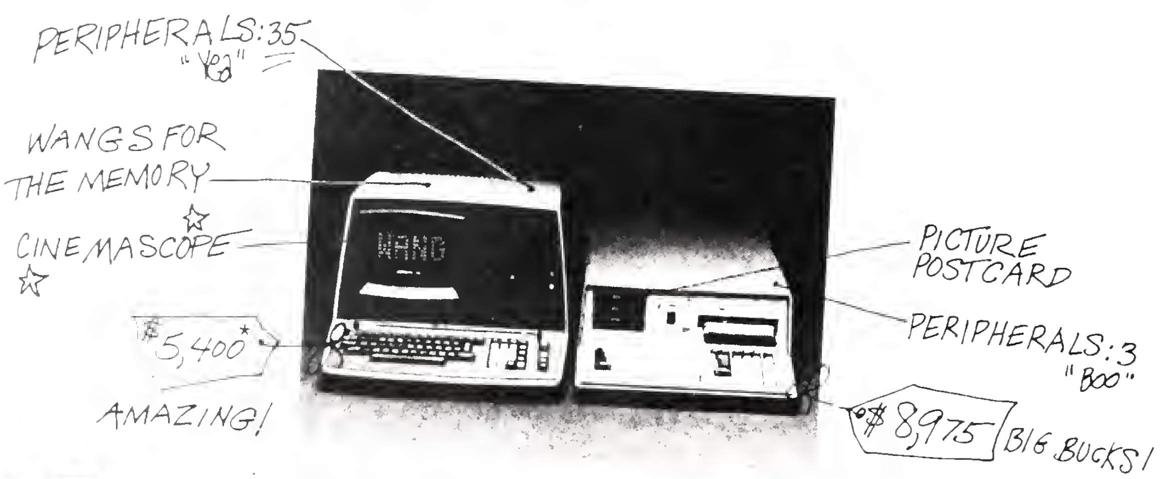
A more realistic approach is to give the data base manager the broader set of suggested responsibilities so that he can become an effective force to influence design and thereby control performance.

Unaware of Problems

Few organizations have bestowed the wide-ranging responsibilities and authorities upon their data base managers, mainly because most are not aware of the multitude of problems associated with the massive movement of data into an on-line environment.

They place their faith in the DBMS only

(Continued on Page S/24)



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Sportswear Maker Opts to Lease Core From Independent Rather Than Upgrade

By John P. Hebert
Of the CW Staff

PORTLAND, Ore. Faced with the prospect of having to upgrade a mainframe just to get extra core memory, a sportswear manufacturer here opted to lease independent memory instead.

Jantzen, Inc. went to an on-line order file inquiry application in early 1974 with its IBM 370/145 Model 1. The machine had 256K core memory and operated under OS/VS1, according to Ed Roeske, director of DP.

It was also the first time IBM's CICS was used by the company, and there was a poor response time experienced with the application, Roeske said.

The computer wasn't able to handle both the on-line system and the processing of normal workloads, including order processing, inventory updates and order allocations for a prebilling system and payroll processing.

Paging under VS "affected the response time drastically," Roeske said.

The computer could handle the old applications or the new ones with the 256K of core, but it couldn't handle them both together, he said.

With a sporadic response time of anywhere from 5- to 50 seconds on the on-line network, the truth of the matter was that more core memory was needed, he said.

The company first looked into the possibility of adding another 256K of core memory from IBM, Roeske recalled.

However, if that additional block core was to be utilized, the company was told by IBM it had to upgrade from the Model 1 to a Model 2 and also purchase the extra core memory, he said.

Went to Third Party

There was a $210,000 price tag on the Model 2 CPU, so the firm decided to go to a third party for other estimates.

Control Data Corp. had the available memory necessary to carry out the applications, and the company discovered it could lease 256K of CDC core for about $2,000/mo, including maintenance, Roeske said.

The interest on $200,000, if borrowed from a bank at a rate of 10%, would have surpassed the amount of money spent for the CDC core memory on lease, he noted.

By adding the memory onto the Model 1, Jantzen was able to do all of the jobs it needed.

So, in September of 1974, the company brought in the CDC memory. Everything worked fine until about three months later, he said.

At that time, the CDC memory had to be taken off the machine. "It was like going back to the IBM Model 40" the company was using before it bought the 145, he said.

In addition, after the CDC memory was taken off, IBM's memory went down and brought the machine with it, he noted. It took IBM customer service engineers about 10 hours to bring the CPU back up "but it was an extreme case," he said.

CDC engineers were working on the machine for three or four days, but this was because the DP department wouldn't let them have the whole machine, he explained. Jantzen kept using it while it was being repaired.

In June of 1975, the company replaced its IBM 3330 disk drives with CDC 3330-compati-

(Continued on Page S/24)

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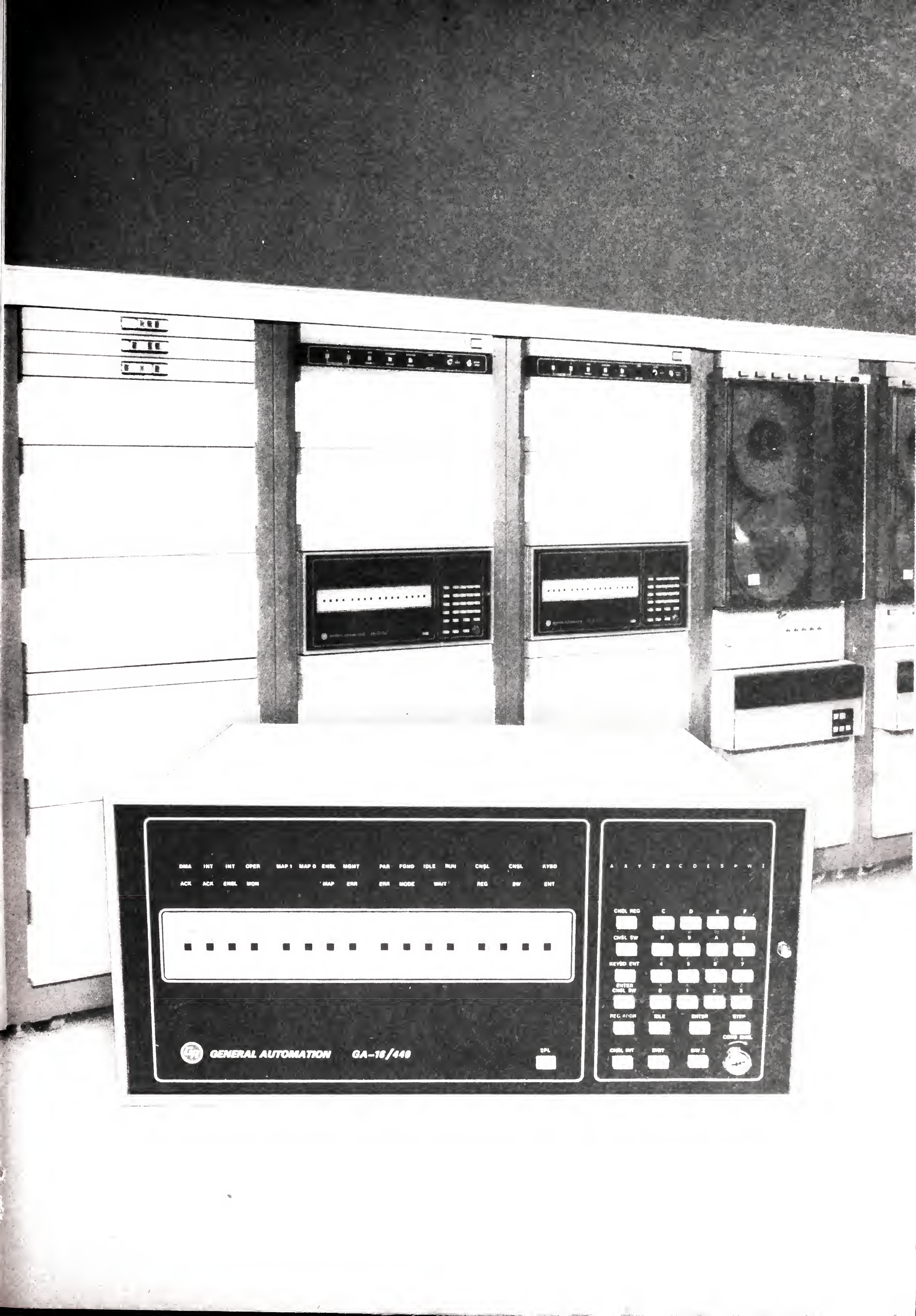
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Condition of Media Used Can Affect Processing Time

(Continued from Page S/14)

tion is not a concern with disks, external contamination is still present, and the extent of this and the resultant effects are dependent on the operating environment in which the disks are used.

Significant also is the fact that automatic disk pack cleaners have only come into their own within the past few years, and manual cleaning has always been frowned upon by both users and manufacturers.

A third reason is that many users lease, rather than buy, their disk packs. For many of these users, taking an approach similar to that of many tape users and simply replacing a troublesome pack is the simplest solution.

While these are certainly valid reasons for taking a different approach to disk maintaince than to tape, they are not valid reasons for ignoring the condition of your disk library.

A recent *Datapro 70* report on magnetic tape and disk pack maintenance equipment reviewed the current offerings of the seven major vendors in this specialized field.

Seventeen users of the tape and disk maintenance equipment offered by these vendors were contacted and interviewed regarding their experience with it. Sixteen of these users had tape maintenance equipment, and the size of the libraries they maintained ranged from 1,500 to 325,000 tapes.

Only one of these users had gone through any kind of a library evaluation process prior to purchasing the equipment. In almost every case, the amount of time being lost as a result of tape problems simply became so obvious the user could no longer tolerate the situation.

The one user who did conduct a program to determine the condition of his library found that almost 20% of his tapes were unfit for use and commented that he "hadn't gotten to the old tapes yet."

Another user, with 3,000 tapes in his library, has had a tape maintenance program in operation since 1966. This user is still using, on a daily basis, tapes he purchased in 1964.

All of these users had purchased tape maintenance equipment and installed some kind of a planned maintenance program. While most of the users would not estimate the amount of savings they were getting from the program (one claimed $9,000 of the first year and from $2,000 to $4,000 each year thereafter in CPU time alone), they were all in agreement that the merits of such a program far outweighed the time and costs involved.

One disk user had 450 disk packs in his library and inspected about 20 packs a week. Packs which had caused data checks were inspected immediately, and others were handled based on the length of time in use.

In this case, the user felt that in his installation the time and money expended was justified if he avoided three head crashes a year, and he was satisfied his maintenance efforts were enabling him to do at least this well.

Pleased With Equipment

The 17 users interviewed by Datapro were generally well pleased with their media maintenance equipment, which included tape cleaners, tape cleaner/evaluators and disk pack cleaner/inspectors.

Overall, on a rating scale ranging from 1 for poor to 4 for excellent, the users assigned weighted average ratings of 3.7 to the overall performance of the equipment, 3.7 to its ease of operation, 3.5 to its hardware reliability, 3.6 to the vendor's technical support and 3.7 to the promptness and 3.8 to the quality of the vendor's maintenance service.

For computer users who do not feel they can justify the expense involved in purchasing or leasing tape or disk maintenance equipment, there are service organizations that will either perform the maintenance functions or rent the equipment on a short-term basis.

There are a number of these organizations offering a variety of services. A company in the Los Angeles area called Datavan, for instance, has mobile units which come to the customer's site and perform cleaning and testing of magnetic tapes right in the van itself.

Another company, Data Maintenance, Inc., brings its disk maintenance equipment to the user's site and performs cartridge and disk pack cleaning and evaluation on the premises.

A number of other organizations will either clean and test magnetic tapes at the request of users or will rent the user the equipment on a weekly basis.

The answer to budgetary belt tightening is not only to put off the purchase of new equipment, but to get the most out of what you have. For many computer users, a tape or disk pack library maintenance program may be a major step toward accomplishing this.

Gorman is peripherals editor of Datapro 70, *published by Datapro Research Corp. at 1805 Underwood Blvd., Delran, N.J. 08075.*

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Five Methods Outlined

Data Entry Products Can Cut Time, Costs, Errors

By William G. Moore Jr.
Special to Computerworld

There are a lot of well-known ways in which data entry products can cut time, costs, consumable supplies and error rates in data conversion.

Labor savings, by substituting electronic for mechanical action, typically run 35% or more over keypunch. Reusable media, like tape, disk or even main memory storage, saves on supplies to the tune of almost $2 per 1,000 cards. Sight verification coupled with streamlined key-verifying procedures can move a document through data conversion at speeds up to 70% faster.

And many of the newer data entry features, such as table lookup, are so efficient that, in some repetitive format functions, operators actually perform one-fifth the number of keystrokes previously required.

All of these benefits have pretty well been documented and described at length during the past decade, from the time that key-to-tape devices first made users aware of the potential savings in the data entry function.

Today's potential savings are more subtle and more total systems-oriented than those clearly delineated benefits of earlier key-to-something products. But they are far more profound.

They have to do as much with the way the user conceptualizes data entry functions as with the mechanization and staffing he brings to the job.

Five Techniques

There are five techniques that we at Inforex, Inc. recommend to our users. Try just one on a pilot basis, and I think you'll be amazed at the immediate and tangible throughput improvements.

Most users are still tied to the batched method of record-by-record, batch-by-batch entry and verification. They may go faster and verify less often, but they still have that build-in "pause-and-shift" time-wasting step that is inherent in dealing with small packages.

Try to think in larger entities, forgetting about batch headers and what seems to operators, but not to modern data entry systems, as a necessary pause between records and batches. Stream your conversion in nonstop keystroking, eliminating headers, keystrokes and the natural pauses operators take between source documents.

In most systems, you can build in a series of flags and error condition checks that will radically simplify error correction of the streamed data. This will take slightly longer at the correction stage, but dramatically improve the time it takes for initial conversion.

Fast-start procedures

Many of the newer key-to-disk systems are programmable by the user. This is both a curse and a blessing. If you have to queue to gain access to programming skills to get your applications up, it's the former. Once they are up, it's the latter. Regardless of the accessibility you have to software skills, develop your initial systems in a way that minimizes future dependence and allows you maximum freedom.

The only way to do that is to think carefully, from the outset, of the functions you want performed. one of the first of them should be the capability to program on the screen using your own staff. That alone will cut future changes from man-weeks to a few man-hours of effort.

Still other front-end procedures include methods to automatically generate formats, a chronic need; establish and modify editing standards not too important until you need to do it; insertion and deletion rules, including a wide range of legality checks.

Once high-volume data entry users get conversion flow to a peak, they look for little areas of improvement.

One that isn't so little and that bogs operators down seriously is the ability to access or "save" arithmetic accumulations that are needed to complete a record. Losing track of these saves, even momentarily, can break the rhythm every data entry supervisor knows is so crucial to clean, high-volume conversion

Plan in advance to train your staff to make use of the power of their data entry equipment to give them an immediate and secure storage area to tuck away arithmetic or alphabetic inserts and accumulations

Better menu planning begins at the supervisory level, with a recognition and foresight that formats abet productivity only if they have been anticipated, defined, stored and made instantly available for use.

The most [illegible] meet these criteria. It is the most frequently used formats that deserve the special attention. Get them planned, structured and entered into the system as soon as you can. The implications are hundreds of hours per month of additional productivity in many large installations

Achieving self-reliance is the biggest money-saving step an organization can take. What it means, simply, is to develop the mental attitude that the data entry equipment is capable of producing correct, clean, edited, formatted data without much reliance on central processor editing runs

At Inforex, after we had installed about 2,500 intelligent key entry systems two years ago, we did a series of studies on

(Continued on Page S/24)

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To Manage On-Line Storage

Efficient DBMS Needs Administrator

(Continued from Page S/18)

and doom themselves to a continuing series of problems and ineffective use of their storage and processing capabilities.

Looking to the future, it seems safe to say that disk and drum technologies will continue to improve. Bigger, faster devices will become available at reduced cost. Mass-storage systems are with us now and will flourish in the future.

Without doubt the on-line storage of data will continue to grow. All of this will inevitably lead to increases in the sum total of real dollars being expended for on-line storage.

This being the case, and assuming it is economically justifiable to put this data on-line, it can be put on-line efficiently and effectively or it can be put on-line shamefully and wastefully.

Even in the face of the huge reductions in the cost/byte of on-line storage, there is a large financial bonus to be reaped by using on-line storage properly. Data to go on-line should be selected judiciously. No one needs instant access to everything to function.

The storage media should be selected wisely. If 1-second data access times are necessary, so be it, but 1-second access times should not be designed into a system when 15 seconds would suffice.

Data should not be kept on-line indefinitely. In all cases there is a definite point of time beyond which it is plain wasteful to continue store data on-line. Data retention periods should be chosen intelligently.

And last but not least, applications should be designed to operate efficiently using today's hardware and DBMS. There is no magic here as the vendors would have us believe.

This is all not transparent to the programming staffs. High-level technical skills must be applied to data base and program design if an efficient system is to result.

Knowledgeable data base managers or administrators, with strong charters supported by top managers, must be in evidence, or an inevitable series of problems will arise and DP dollars will be expended without their full potential return in tangible benefits.

Catania is a manager at Coopers & Lybrand in Philadelphia.

Firm Leases Memory

(Continued from Page S/19)

ble disk/tape drives and, in the process, eliminated the need for an IBM 3345 disk controller saving another $2,000, Roeske said.

The response time of the network decreased to its present two seconds or less — it's normally one second — with the addition of the CDC equipment, he said.

Although there were also problems with the disk/tape drives about three months after they were installed, there haven't been any problems since then with any of the CDC equipment, he said.

The remainder of Jantzen's IBM equipment has been left intact, including two IBM 1403 printers and 3740s in the data entry department, he noted.

In addition, IBM 3740 Model 1 terminals and IBM 3780 printers are used in two distribution centers, and 3780s are also used at a remote plant in Oregon, communicating with the CPU at 4,800 bit/sec over Wats lines, Roeske said.

IBM wasn't happy with the move to the CDC equipment, but there haven't been any adverse effects resulting from the move, he said.

Products Reduce Time, Labor

(Continued from Page S/23)

productivity aspects of our systems.

Improvements were predictable, but by far the area with the largest remaining cost-savings potential, we found, was in the very high level of computer editing still required for producing final clean data.

The off-CPU editing function has expanded significantly since those studies were completed, but it remains the single highest cost item related to data entry.

In some cases, savings from more rigorous source data editing can exceed $100,000 per year. Time savings, while difficult to measure, are even more exciting to consider.

The only barrier to achieving all of these five cost savings is the attitude and perception of people. The equipment can support any of these aspects.

And when you stop to add up the savings — $250,000 a year is reasonable for large operations — you'll have to admit there is some motivation.

Moore is vice-president of domestic operations at Inforex, Inc.

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Throughput Up About 20%

Third-Party 360 Saving Former 370 User $4,000/Mo

By Mal Stiefel
Special to Computerworld

GRANDVIEW, Mo. – Pitman Manufacturing here has saved $4,000/mo in equipment costs and boosted throughput by an estimated 20% since November, when it swapped its 370/125-based configuration, rented from IBM for a multivendor installation centered around a 360/40 and leased from Greyhound Computer Corp.

The initial one-month conversion period was "difficult," but the facility has run smoothly since then, according to Jim Drake, spokesman for the maker of aerial "cherry picker" devices and digger derricks.

Part of the difficulty arose in modifying JCL statements in the move from DOS/VS to The Computer Software Co's Extended DOS (Edos) package, he said.

The conversion also entailed recompilation of all application programs to create new libraries on the 360/40. A program was written in-house to assist in the process by changing SELECT clauses in Cobol programs automatically.

The company also had some trouble installing its multivendor teleprocessing operation, which includes IBM CRTs, a Memorex 1270 controller, International Communications Corp. modems and a telephone company leased line. After the initial problems were overcome, this system has run well, Drake said.

IBM's Minimum Teleprocessing Communications System software package, which supervises the remote operations, was moved to the 360/40 from the 370/125 without modification, he noted.

Less Disk Now

The 370/125, installed in May 1974 to replace a Honeywell 1200, had 192K bytes of core, four IBM 3410 tape drives, four 3330 disks, a 3203 printer, a 1442 card reader/punch and four 3270 CRTs.

The present system has 256K bytes of core, four Telex tape drives and eight Memorex 2314-equivalent disk drives. Although this configuration has more main memory than the old, it has only half as much disk capacity.

The improvement in throughput resulted from the reorganization and relocation of disk files, primarily those used by the IBM Data Base Organization and Maintenance Processor (Dbomp), a bill-of-materials processor program; the increase in speed on the tape drives; and the capability provided by Edos to run four partitions at once instead of the three under DOS/VS, Drake said.

The 370/125 was originally acquired because of the software packages furnished by IBM for material requirements processing (MRP) applications, Drake said.

But after the system was running for a while, management became unhappy with throughput – 440 hours a month were being run up on the meter.

Anxious to hold costs down, the company ordered an investigation into the cause of the poor performance which led to the discovery that disk access time was excessive on the Dbomp indexed sequential files.

IBM was called in to assist, but it "didn't get a response," Drake said. After unsuccessfully trying to solve the problem in-house by splitting files on different disk packs, the company decided to shop around for another system.

When the changeover was made, files were rearranged once again and disk space allocations were reduced for data files and sort work areas.

Improvements were noted in many jobs as soon as the JCL problems were straightened out, Drake said. The MRP operation, for example, went from a 12-hour run to seven hours, he added.

Currently, 400 meter hours a month are used to process applications including MRP, inventory control and accounting.

The CRTs are used for retrieval and data entry, but not yet for updating the data base; the update function is still performed by a batch program after the entered data has been validated.

Media Care Devices Described in Report

DELRAN, N.J. – "All About Magnetic Tape and Disk Pack Maintenance Equipment," a report describing the currently available devices for cleaning, testing and certifying magnetic data storage media, is available from Datapro Research Corp. for $10.

Reprinted from the March supplement to *Datapro 70*, the 10-page report describes the current product lines of seven vendors of media maintenance equipment: Computer-Link, Data Devices International, General Kinetics, Graham Magnetics, Kybe, Randomex and Recortec.

The firm is at 1805 Underwood Blvd., Delran, N.J. 08075.

Computek Introduces Data Entry System

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – Computek, Inc. introduced a data entry system that combines its Series 200 intelligent terminals with local storage media, hard-copy printers and applications software at the Computer Caravan here recently.

Known as the Computek Data Entry System (CDES) the data capture unit can be used for both data entry and source data collection. Applications include order entry, inventory control, accounting, payroll, production control, personnel information and customer/account processing, Computek said.

CDES was designed to perform I/O tasks such as communications to the host processor, printing and file management, without halting ongoing data entry operation, the company added.

The system is available in three configurations: the Model 200/D10, with one workstation, the Model 200/D20, with two workstations; and the Model 200/D40, with four workstations.

Each model includes its own terminal processor with 32K bytes of internal memory, one or two CRT/keyboard workstations, up to six flexible disk drives for terminal programs and local data storage, a character or line printer for reports and hard-copy output, a communications interface and terminal-resident data entry software, the firm said.

All CDES processors feature a single source/destination transfer bus using 10-bit data words and 16-bit instruction words. This architecture allows a two-address move which Computek said is suited to transferring data between terminal components and external devices.

The processor cycle time is 650 nsec with all instructions executed in 1.3 μsec.

The CRT screen provided with the system is available with 480-, 960- or 2,000 characters. All characters are formed on a 20 by 14 dot matrix.

As a storage medium, CDES uses IBM 3740-compatible flexible diskettes.

Processor features include vectored interrupt, real-time clock and hardware macro facility. All standard peripheral device controllers can be attached to the interrupt systems, Computek said.

Three Software Modules

The CDES operating software is divided into three parts, forms creation, supervisor and data entry. Each is executed at the terminal without host processor intervention, Computek said.

The CDES forms creation program, known as Easyform, allows the user to create forms on the terminal's master console and store them locally on the terminal's diskette, according to the company.

The supervisor program shows the user system status information, opens terminals for operator use and provides initialization procedures.

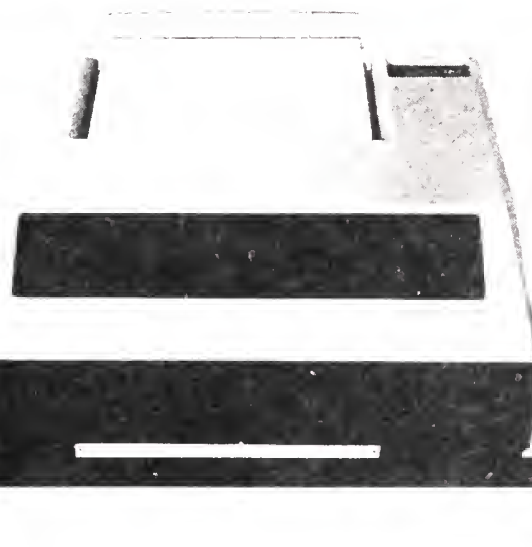
One or more data entry programs used in a data entry "production" mode calls up forms to enter, edit, verify, update and locally store data, as well as handle communications to the host, allocate systems resources to user tasks and schedule processor and peripheral functions, Computek said.

All three modules operate under a real-time operating system that schedules tasks and allocates system resources, the vendor added.

The Model 200/D10 can be purchased for $15,625, the D20 for $17,960 and the D40 for $19,900.

The systems may also be leased for three to five years. Computek is at 143 Albany St., Cambridge, Mass. 02139.

The Computek Data Entry System is available in three models.



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Packaged Systems Suggested

Single-Vendor Equipment Seen Best for Distributed DP

By Esther Surden
Of the CW Staff

NEW YORK – Avoid complexity in buying equipment when configuring a distributed processing network, Mike Bouros, DP manager for J.W. Mays, Inc., a chain of department stores, told a workshop at the recent Computer Caravan here.

"Try to use the same manufacturer's equipment" so software developed for one part of the system can be used at another part, he suggested.

Novice networkers should use packaged systems wherever possible for ease of operations, Bouros said. "Consider the user," he advised, and try to maintain generalized software wherever possible.

Tailor Software

Software should have some degree of tailorability if the functions differ from site to site at a user's remote locations, he added.

Real-time distributed processing systems require a highly trained, highly paid staff with networking expertise, Bouros said. If data is concentrated in a central location, data base management might have to be implemented and the user gets involved with high hardware costs, he added.

One of the major advantages of a distributed processing network is that a computer at a branch provides ready access to the central CPU by users processing at their own discretion, he said.

Users with a large number of transactions are often "forced into a batch mode," Bouros said, which causes a problem in turnaround.

"By the time the data is input and the reports are back, they are useless," he said. This is another reason why users should consider distributed processing.

Horizontal Structure

Distributed processing networks can take the form of a series of CPUs interconnected with phone lines. In this type of horizontal structure, there is limited transmission of data between the sites.

If numerous locations are all fighting for the line and a schedule of what time of day each can use it must be worked out, the network can be difficult to implement, Bouros said.

In the hierarchical structure, a single facility is designated the hub of the operation and contains a centralized system of the same size or larger than systems in remote locations. The systems are interconnected through dial-up or leased lines.

This type of system may contain a small degree of "noncritical, on-line capability," Bouros explained.

Model Networks

Using examples from the retail industry, Bouros and Charles Jones, MIS director for Mays, gave the group descriptions of two model distributed processing networks.

Mays' configuration includes an IBM 370/145 at a central site with a Periphonics front-end processor for communications. At each of its eight stores, the firm has Singer System 10s for point-of-sale (POS) operations with one disk drive and a keystation with a printer.

The firm also has an Entrex 480 key-to-disk system with CRTs, Bouros said.

At the store level, the POS cash registers have Kimball ticket readers that process the tickets from the merchandise.

Polled Nightly

The System 10s at the central site are polled every night, transporting sales reports to the store by the morning. Reports produced at each store for the sales manager's use include sales by department and store totals; reports for the cashiering department includes sales by register.

The configuration at Dillards department store chain in the Little Rock, Ark., area was described by Jones. That system uses the IBM 3650 processor with disk storage connected via telephone lines to an IBM 370/145 that polls at night.

"The payoff really comes in the longer term benefits of distributed processing," Bouros concluded.

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Tape Library, Drives Reduce Costs for Auto Maker

By Mal Stiefel

Special to Computerworld

CENTER LINE, Mich. – Chrysler Corp.'s Parts Division has seen dramatic cuts in material and labor costs, along with improved operations, since installing 10 Storage Technology Corp. (STC) 6,250 bit/in. tape drives and California Computer Products, Inc.'s (Calcomp) automated tape library system on its 2M-byte IBM 370/155.

Savings in tape drive costs alone have reached $2,900/mo. since the company signed a revised 36-month contract with STC.

Also, before the switchover in late 1974, tape purchases had averaged 100 units a month. Since then no new tapes have been needed, reducing expenses (temporarily) by another $1,000 a month.

Tape transfer rates have gone from 320 kbit/sec to 780 kbit/sec, speeding up some I/O bound programs.

The automatic tape library, termed a "really sweet" system by a company spokesman, Bob Dolan, has helped even more by

- Sharply reducing the need for tape-handling personnel
- Cutting reruns (formerly due to incorrect tape mounts)
- Providing for automatic scratching of tapes on their expiration dates

Fewer Tapes Needed

Ultimately, the company expects its tape needs will be 25% lower with the high-density drives than they would have been if the old configuration had been kept. Currently, there are 8,000 tapes in the inventory.

Most files remained on one reel after the change was made. A substantial number of small files were left at 1,600 bit/in.

Other files were left at 1,600 bit/in. because they are also used on outside facilities, such as microfilming systems, that can't accept 6,250 bit/in. inputs.

In one instance, a 10-reel master file was shrunk to three reels.

Most packing was done on archival tapes, where many files customarily reside on each volume and where each tape is filled as completely as possible.

Smooth Conversion

Conversion went smoothly on the new drives, which include six 6,250 bit/in. units and four dual-density 1,600/6,250 bit/in. drives.

Changes were needed to data control blocks in Job Control Langauge statements, but application programs weren't affected.

Blocking factors were increased over a period of time, particularly in larger files.

After the new units were running for a while, it was noted that old tapes, certified at 1,600 bit/in., could be used without difficulty at 6,250 bit/in., contradicting the notion that read errors would appear in such tapes after relatively few mounts.

Tape Library Under OS

The automatic tape library, installed last April, is controlled by a Digital Equipment Corp. PDP-11, which manages the passing of tapes between the library storage cabinets and the tape transports.

Active tapes (those to be used in forthcoming jobs) are loaded manually into any of the six cabinets in the library. Each cabinet can hold up to 440 reels in self-loading canisters, so the system capacity is over 2,500 reels.

When a new tape is put into a cabinet slot, the reading mechanism in the library reads the header label on the tape (all files use IBM standard labels), the PDP-11 makes a request to the mainframe supervisor (OS) to store the header information, along with the library storage location, on disk.

Thus, even if the PDP-11 goes down, tape locations are available to it as soon as it comes back up.

Tape Mounting

When OS calls for a tape, it hands the tape location to the PDP-11, which controls movement of a picker arm to the proper place in the proper cabinet. The tape is then plucked out and moved to the tape drive, where it is mounted automatically.

The process is reversed in demounting.

System Peripherals

When it reads a header label, the PDP-11 checks the expiration date to see if the tape is eligible for scratching. If it is, it can be scratched by a program that is run once a day on the 370.

Cost of the automatic tape library, including 24-hour, seven-day maintenance, is $5,000/mo.

The system includes 1M byte of memory from Electronic Memories & Magnetics, Inc. (EMM) 16 3330-equivalent disk drives from Control Data Corp. and an IBM 3211 printer. There's also a satellite Potter Grandslam printer, which puts 15 char./in. on each line and uses 8- or 10 line/in. vertical spacing.

The company seems firmly committed to a multivendor environment. In most cases, each supplier maintains its own equipment: Sorbus, Inc. maintains the EMM memory.

The CPU is scheduled for replacement in April by a 370/158, which will include .5M bytes of memory from IBM and 2.5M bytes from Intel.

Dataproducts Has 32K Memory System

WOODLAND HILLS, Calif. – A planar core-memory system from Dataproducts Corp. provides 32K-word by 20-bit capacity on a single board.

The Store/3220, the three-wire, three-dimensional planar memory system feautres 750 nsec cycle time and 300 nsec access time.

The Store/3220 is expandable to 130K words in a 5-1/4-in. chassis which includes a power supply option. Up to eight 32K modules can be daisy chained to form a system with a capacity up to 262K by 20 in two 5-1/4 in. chassis, the firm said.

Core arrays and all electronics are housed in a module that measures 11.7 in. by 15.4 in. by .98 in. and consists of two circuit boards.

The Store/3220 sells for less than $2,400 in quantities. Delivery is 120 days from the firm at 6219 De Soto Ave., Woodland Hills, Calif. 91364.

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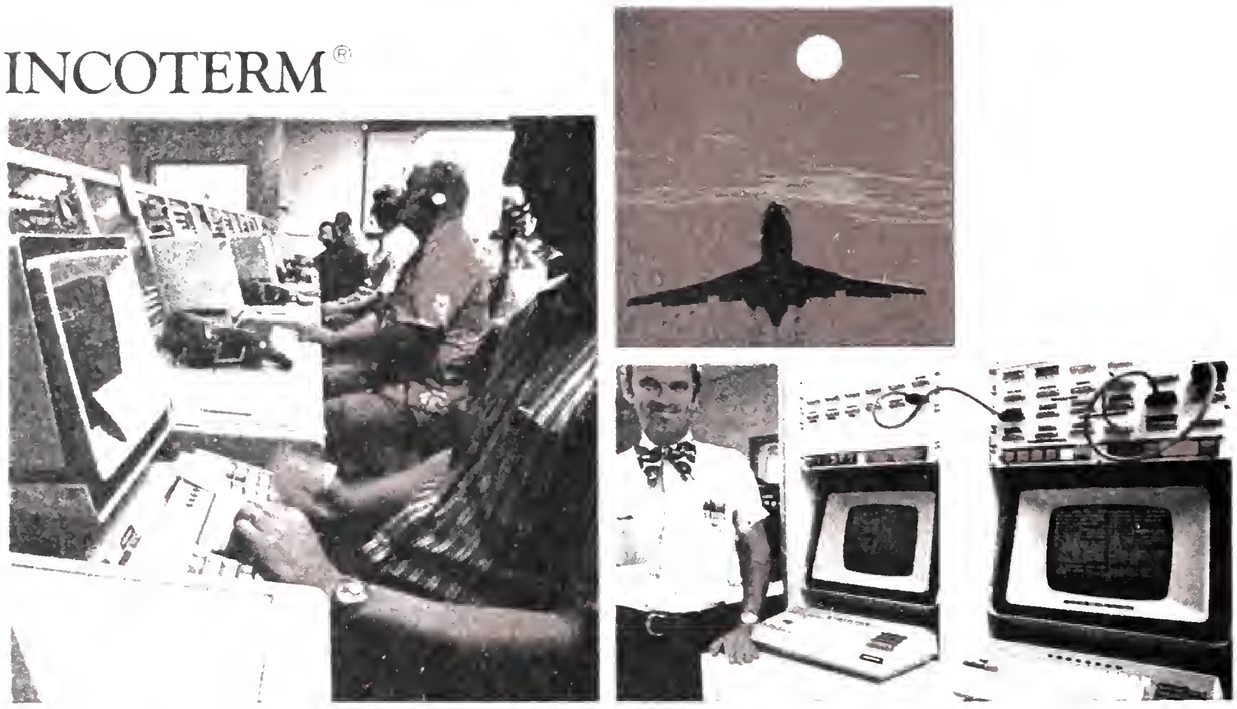

Aeronautical Radio, Inc., better known as ARINC, is the communication services arm of the air transport industry.

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Mini Bits

Magnetic Tape Controller Available for DEC PDP-11s

ANAHEIM, Calif. Western Peripherals has an embedded magnetic tape controller for use with Digital Equipment Corp. PDP-11 minis.

Available for both PE and NRZ formats, the TC-130 Universal Magnetic Tape Controller is software-transparent to PDP-11 minis, the firm said, and can control up to eight industry-standard interface tape units.

Features include automatic read/write "on the fly" which allows consecutive read/write operations, the firm said. a 33-word data buffer increases flexibility in assigning priorities when programming data transfers, it claimed.

The system occupies four PDP-11 slots and the controller with tape drives costs $3,500 from Western Peripherals at 2893 E. La Palma Ave., Anaheim, Calif. 92806.

Qantex Cartridge Fits Rolms

PLAINVIEW, N.Y. The Qantex Division of North Atlantic Industries, Inc. is offering cartridge data storage systems for users of Rolm 1602 and 1603 minicomputers.

The systems are based on the 3M DC300A tape cartridge, a Qantex spokesman said, and range in size from 22.5M bits to 90M bits.

They come in single-drive, twin-drive and quadruple-drive configurations, Qantex said.

The interface cards plug directly into the Rolm mainframes and were designed to meet military requirements, as was the Rolm mini.

Cost of the Model 2200 single-drive storage system interfaced to the Rolm computer begins at $4,975, Qantex said from the 200 Terminal Drive, Plainview, N.Y. 11803.

Warrex Has Business Systems

DALLAS – Warrex Computer Corp.'s Centurion systems are available in two configurations, according to the firm.

The Centurion II with a 16K-byte MOS random-access memory, 10.6M-byte disk drive, CRT and 175 char./sec printer costs $24,950 with the OS II operating system.

The Centurion IV with 65K bytes of memory, a 10.6M-byte disk, two CRTs, 175 char./sec printer, operating system, real-time clock, parity and a Telecom 300 modem costs $33,600.

Application and special industry programs are available at an additional cost, a Warrex spokesman said from 12505 N. Central Expressway, Dallas, Texas 75231.

Mini Speeds Work of Transportation Unit

By Esther Surden
Of the CW Staff

SAN DIEGO A minicomputer at San Diego County's Department of Transportation is working two hours a day to do jobs it took an IBM 1130 batch system 10 to 12 hours each day to perform, the user said.

The Digital Equipment Corp. PDP-11/45 was chosen by the county from a group of systems offered by manufacturers responding to requests for bids, according to H.F. Sorlie, assistant director. Some of the specification requirements included 64K words of core, two tape drives, two disks, a card reader, a line printer and a multiplexer capable of hooking up to 16 terminals to the system, James Gay, chief of the programming group, said.

The county also wanted multiprogramming ability and Fortran to make software conversion from the 1130 easier.

"We had two ways we could go," Philip Barker, chief of the [illegible] section, recalled. "We could upgrade the 1130, buy an IBM look-alike replacement for it or we could go the minicomputer route."

Looked at Replacements

When it began looking at faster IBM replacement systems the county realized the software was still limiting, so it decided to scrap everything and begin fresh with a different system, Barker said.

The field was narrowed to five minicomputer vendors because of their responses to the bid requests. Hewlett-Packard, Modular Computer Corp., Data General Corp., Interdata and DEC were in the running, he said.

The DEC system was chosen because it came closest to the County's price limitations and met its specifications, Gay said. The system cost about $150,000 when purchased in 1974, he added.

Since the system was delivered, the county has added another 64K of an independent manufacturer's memory and brought the total memory up to 128K, the maximum for the system, Gay said. The system now also has three 20M-word disks and five terminals, three of them CRTs.

A Tektronics interactive graphics display and graphics tablet has also been added to the system, Gay said.

Monitors Rainfall

The system is used to monitor rainfall and water levels. A priority interrupt feature halts a long program and inserts a more important program, such as a flood warning, when the need arises, the user said.

(Continued on Page 32)

DG/DAC Ties CPUs to Sensors For Lab, Industrial Applications

SOUTHBORO, Mass. Designed for laboratory and industrial end-user applications, the Data General Corp. Data Acquisition and Control DG/DAC subsystem ties DG minis to a variety of sensors, laboratory apparatus and processing devices, the firm said.

The subsystem features a library of analog and digital I/O function modules, a capacity of over 1,000 lines, optional high-throughput line controller and "designed-in features" for dual-computer configurations, the vendor said.

Software support for the subsystem is provided by a library of device handlers and subroutines that control I/O transfers between user programs and sensor hardware or instrumentation, the company noted.

SAM Package

The Sensor Access Manager package (SAM) works with real-time multitasking operating systems and Fortran compilers, the firm said.

Printed circuit I/O control cards handle a variety of analog and digital signals. Included is a series of high-speed analog-to-digital converters for the low-level analog inputs typical of laboratory instruments and analyzers, a spokesman said.

Any combination of analog and digital signal lines can be mixed in the same subsystem chassis, according to the firm.

I/O cards typically handle 16 lines each and up to 16 cards can plug into a DG/DAC chassis and power supply unit, the company noted. Each chassis is accessed and controlled by DG minis through a chassis control card which provides the interface electronics between the subsystem and the computer's I/O bus.

The DG/DAC can be interfaced to the mini via the Data Control Unit (DCU). Occupying a single slot in the mini, the DCU is a dedicated I/O processor that converts programmed I/O for data acquisition and control into high-speed data channel transfers, DG explained.

Two central processors can access a single DG/DAC subsystem, allowing system builders to use redundant computers for critical experimental applications or industrial operations requiring full-time monitoring or control, the spokesman said.

A representative subsystem with 64 analog and digital lines and including chassis, I/O cards, cabling and terminal strips costs $5,200.

With 500 analog and digital lines, two chassis, I/O cards and provisions for dual-computer operation, the subsystem costs $19,800.

A system with an Eclipse S/200 mini with 32K words of memory, 215 lines, the DG/DAC susbystem, I/O cards, diskette subsystem, 10M-byte cartridge disk storage and display terminal costs $51,500 from the firm in Southboro, Mass. 01772.

Ball Rolling With Dasl System

OAKLAND, Calif. The Data Access System Language (Dasl) multiterminal small business system from Ball Computer Products, Inc. was designed for on-line manufacturing and distribution applications, the vendor said.

A minimum configuration includes a 16-bit minicomputer with 32K words of core memory, two CRTs operating in page mode with a maximum screen size of 20 lines, a 5.8M-byte disk storage drive, magnetic tape drive and a control console with a hard-copy printer, Ball said.

The Dasl system software includes a language for transaction-oriented applications programming, an operating system and data base management software, the firm added.

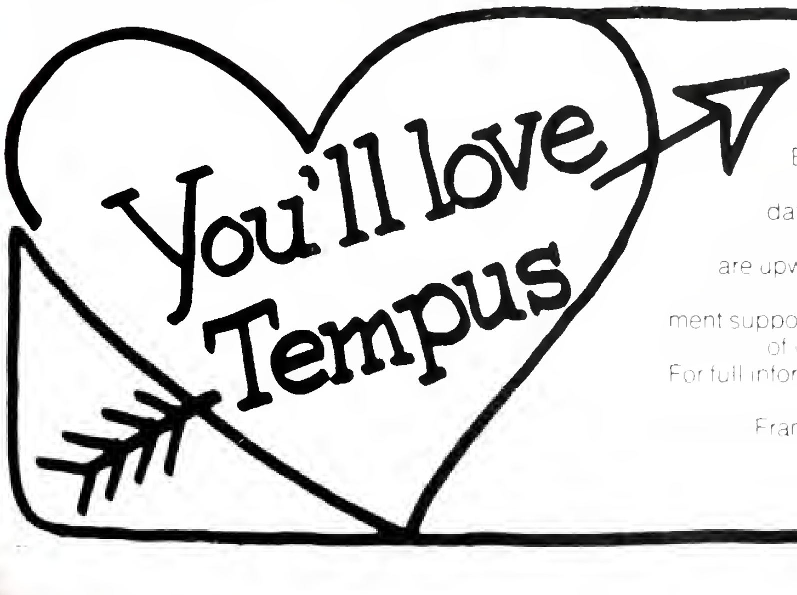
The language provides a set of over 250 precoded routines in meta-compiler format that handle business and data management functions, and can be combined to produce on-line business applications, Ball said.

The system can be expanded in stages to a total of 16 CRT terminals and 400M bytes of disk storage. Options also include high-speed tape drives, printers, card readers, desk cabinets, multiplexers and controllers, Ball added.

Dasl can be used to implement transaction-oriented applications in production and inventory control, accounting, materiels handling and forecasting, Ball said.

Different transactions can be processed concurrently at each terminal, or groups of terminals may be devoted to the same task, the firm said.

The minimum Dasl system configuration costs $48,500 or about $1,090/mo on a five-year lease, a spokesman said from 5601 College Ave., Oakland, Calif. 94618.



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Mini Speeds County Unit's Work

(Continued from Page 31)

With the old system, a priority job had to wait until the batch system finished the job on which it was working.

The mini is also used to file soil test results, compile monthly reports and contract payments for work in progress. The interactive graphics system and tablet is used to help with mapping.

A geographic data base has been developed, Barker said, which helps the department prepare survey maps, draw excavation plans and estimate the amount of earth removal required.

Most Important Feature

The PDP-11 45, although it is a real-time system, is not being used for its real-time capabilities, Gay said. The most important feature for the county is its ability to handle multiprogramming.

"No one had a time-sharing system with Fortran within our budget at the time we decided on this system," he noted.

When the mapping function really gets under way, the county plans to use the mini more. Admitting that, at the moment, the mini is underutilized, Gay said more applications are being added.

Personnel Involved

Personnel involved with the system includes the person in charge of computer operations, two computer operators, two keypunch operators and four programmers, about the same number as with the 1130 system, Barker said.

Conversion from the Fortran on the 1130 to the DEC Fortran was fairly easy, Gay said, because the two are close in construction.

Reliability of the hardware has been fine since the initial bugs were removed, Barker reported, and the software is finally settling down. DEC maintenance was also termed "very good."

Model 400 Bows

IDLEDALE, Colo. — The Model 400 turnkey system from Computer Talk, Inc. operates from a battery which is charged from the line, according to the vendor.

The basic system, which costs $16,000, has a CRT, light pen, full Ascii keyboard, acoustic modem, real-time clock, 1.2M-byte disk drive and 125 nsec 16-bit processor with floating point and virtual memory, the firm said.

Up to eight processors can be connected for uninterrupted and high processing rate applications.

The system software includes operating, security, assembler, Fortran IV, text editor and file management programs. The operating system allows eight users to share each memory partition at the same time, the firm said.

Computer Talk is at P.O. Box 100, Idledale, Colo. 80453.

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Also Performs Inventory Control

Flower Firm Picks Small System to Handle Invoicing

By Esther Surden
Of the CW Staff

SEWELL, N.J. – A flower distribution firm here has put its invoicing and inventory control on-line using a small business system.

Delaware Valley Wholesale Florist, Inc. buys or takes on consignment flowers from California, Florida and South America as well as from local growers and sells them to retail florists in the New Jersey area.

The company needs to have its orders picked, packed and delivered with finished invoices the same day an order is placed. The user stocks approximately 1,000 different kinds of perishable items.

"The salesman takes the order over the phone, fills out a sales order form, and the order is then picked and packed before it's invoiced. So we really do one-step invoicing, as opposed to order entry," John Wilkins, treasurer of the company, said.

Three CRTs

Three CRTs are used by the office staff to inquire into inventory levels of the items being ordered, while the customer is still on the phone. Eight salesmen phone about 40 customers each for the orders.

When the company began looking for a computer about 1-1/2 years ago, they were using a Burroughs Corp. L2000 business machine and a Burroughs accounting machine.

Invoicing and some of the consignment reporting for sales distribution was performed on the L2000. All of the accounts receivable and accounts payable were done on the accounting machine, Wilkins said.

Contacted Several Firms

The firm investigated the NCR Century series, the IBM 3 Model 6 and the Burroughs B700. Digital Equipment Corp. was also contacted. The NCR systems were ruled out because "we felt they didn't have enough systems in the area and that they were batch-oriented systems," Wilkins said.

DEC didn't seem to want the firm's business, Wilkins added, because at the time they weren't marketing small business systems in the New Jersey area.

When an advertising piece arrived from Basic/Four Corp., the wholesaler canceled its Burroughs B700 order. The Burroughs system used cards and couldn't run more than one program at once, Wilkins continued.

The Basic/Four system cost the firm $55,000 when purchased about a year ago. The firm has added a third terminal and second disk drive to bring the total cost up to about $70,000, Wilkins said.

The system configuration used by Delaware Valley consists of a Model 400 CPU with 40K bits of core memory, two disk drives with a total of 8.4M bits of storage, three CRTs and a printer.

By contrast, the Burroughs system would have cost around $70,000 and would have required a great programming effort, Wilkins, who programs the Basic/Four system himself, said.

Wilkins said he learned programming on the firm's L2000s, but went for training at Basic/Four's New York education center for two weeks to learn the new system.

Functions Handled

Business functions handled by the system include flower and supply invoices, perpetual supply and cut flower inventory, daily age trial balance; daily cut flower costing report, salesman commission reports; sales analysis by customer, vendor, salesman, departments, routes and products, accounts receivable, accounts payable, and purchase orders.

The programming required to perform these functions was tailored and, to a large extent, custom-designed to meet Delaware Valley's needs. These software packages are now being offered by the firm to other wholesale florists.

"I belive we've done some pioneering work in computerization in our particular industry and we'd like to share the benefits of this development work with other wholesalers who have needs similar to our own," Wilkins said. "And while other wholesale florists have computers installed, we are probably among the first to go into it this deeply, with an on-line, real-time system.

"The cost of our Basic Four system is somewhat more than that of the two manual machines we were using before we got it," Wilkins noted, "but it's doing more work."

The firm eliminated the need for one person in the office and doesn't foresee the need to add any more for awhile.

"If we had remained under the old system, we would certainly need more office help by now," Wilkins added.

Varian Links Statos With Video Sources

PALO ALTO, Calif. – An interface that provides users with hard-copy output from a video source using the Statos printer/plotter is available from Varian Graphics.

The interface is compatible with RS-170-type video signals and copies a typical screen image in 5 sec, the firm said.

The Statos printer/plotter will maintain complete printing and plotting capability with the mini when a parallel interface is used. Thus the user has a printer/plotter as a computer peripheral and a video hard-copy unit, Varian said.

The picture size is controllable by moving jumpers on the PC boards. Ratios from 1:1 to 16:1 can be achieved, and the user may also elect to have positive or negative hard copy, according to the firm.

The interface, which operates with either the Statos 41 or 42 series printer/plotter, costs about $1,000, a spokesman said. Interfaces and software drivers are available for "most popular minicomputers and operating systems," Varian said from 611 Hansen Way, Palo Alto, Calif. 94303.

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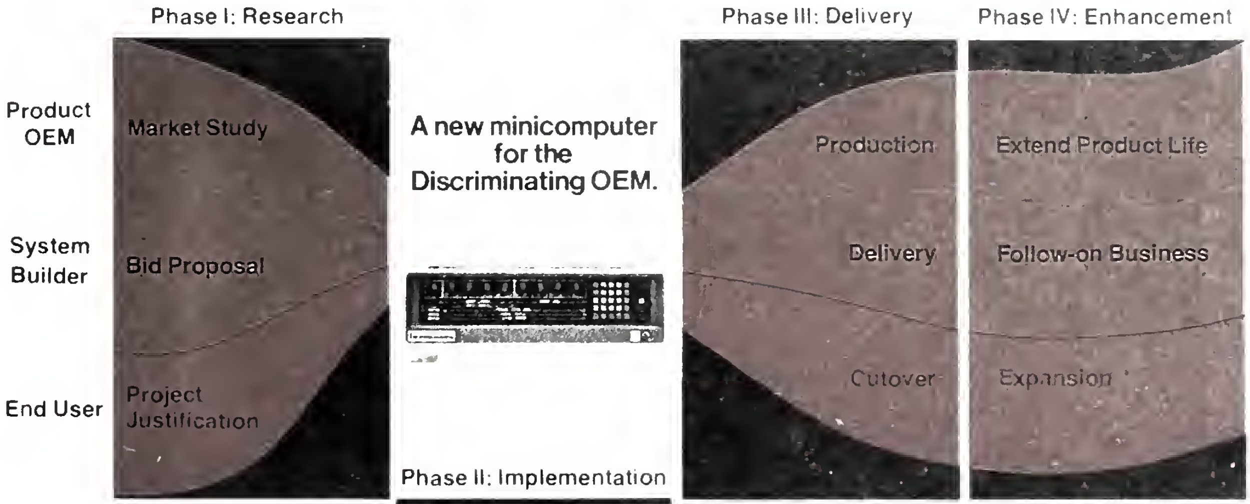

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Upgrade of CDP1801

RCA CPU Uses Closed COS/MOS Logic

SOMERVILLE, N.J. – The RCA Solid-State Division has introduced the CDP1802 central processing unit and a variety of memory and I/O circuits said to provide additional flexibility to the firm's CDP1800 microprocessor family.

The CDP1802 is upwardly compatible with the earlier CDP1801 two-chip CPU, RCA said. Although many instructions have been added, programs designed for the CDP1801 will run on the 1802, an RCA spokesman said.

The single-chip, 8-bit, 40-pin complementary metal oxide semiconductor (CMOS) microprocessor is both price- and speed-competitive with other MOS CPUs, the firm said.

Speed improvements over the firm's CDP1801 are a result of advances in circuit design and process technology which arose "from the use of self-aligned silicon-gate CMOS technology," according to the firm.

Chip density has been increased by a factor of two, it noted, and instruction execution times are either 2.5 μsec or 3.75 μsec.

The firm calls the technology C^2L for Closed COS/MOS Logic, a spokesman noted.

Micro Products

Also introduced with the CDP1802 were:

- The CDP1831 read-only memory (ROM), which interfaces with either CDP1800 CPU at maximum processor speeds.
- The CDP 1832, a silicon-gate CMOS 512- by 8-bit ROM.
- The CDP1824, a 32-bit RAM designed for use in minimum-cost systems where only a small amount of working RAM space is required.
- The CDP1821S and 1822S, silicon-on-sapphire static RAMs.
- The CDP1852 I/O circuit, a general-purpose device for latched input and output ports.

The CDP1802 processor is available in two versions: the 3V to 15V CDP1802D, which costs $36.50, and the 4V to 6V CDP1802CD, which costs $23.50 in 100-unit quantities.

The previously announced Cosmac development system is available for support purposes, RCA added. The system contains chassis, power supply, simple control functions, CPU, byte I/O terminal interface, utility routines and slots for additional circuit boards and costs $2,250.

Cosmac runs RCA's resident assembler and editor and may be augmented with a dual-drive floppy disk system and appropriate software, the firm added from Route 202, Somerville, N.J. 08876.

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Computer Covenant System Works in Distributed Net

WEST SIMSBURY, Conn. – A microcomputer-based business and industrial system for manufacturers and distributors is being introduced by Computer Covenant Corp. here.

Designed for operation as a stand-alone unit or as part of a distributed processing network, the system includes a Digital Equipment Corp. PDP-11/03 processor.

Memory can range in size from 8K bytes to 64K bytes; disk can range from 2.4M- to 53.5M byte/drive on floppy or cartridge disks, and line printers can range from 65- to 300 line/min, the firm said.

Up to eight CRTs or other terminals can be attached locally or at remote locations, a spokesman added. In a multi-terminal environment, each terminal can operate on its own program and optionally share data files, he said.

For data collection applications, the system can be connected to remote multiplexers handling up to 15 terminals per line, according to the vendor. The system can also operate bisynchronously to communicate at high speed to another processor in a distributed network, the firm said.

Application support includes order entry and allocation, backorder control, invoicing, sales analysis, material requirements planning, inventory control and accounting, the spokesman said.

A 32K PDP-11/03 with dual floppy disk, CRT, 65 line/min printer, order entry turnkey support and maintenance costs $700/mo and will be available in July from the firm at 136 Old Farms Road, West Simsbury, Conn. 06092.

Microkit Has Development System For Programs on Intel 8080 Types

SANTA MONICA, Calif. – The Microkit-8/16 is a stand-alone development system from Microkit, Inc. for writing, debugging and executing programs on Intel 8080-compatible microprocessors.

The system includes 8K bytes of random-access memory expandable to 32K bytes, a CRT, an Ascii keyboard and two cassette tape units. Software includes a monitor/debugger, editor and assembler.

System features include memory write control for each 1K page of memory, crystal-controlled programmable real-time clock, interrupt-driven I/O and a bootstrap loader.

Two EIA RS-232C serial interfaces for modem and teleprinter are included with the system.

An 8K Microkit-8/16 costs $3,850 from the firm at 2180 Colorado Ave., Santa Monica, Calif. 90404.

Ampex Core Memory Designed for OEM Use

MARINA DEL REY, Calif. – The MCM-4300 from Ampex Corp. is a microprocessor core memory designed for OEM read/modify/write applications, according to the vendor.

Each 450 nsec memory is self-contained, Ampex said.

The MCM-4300 costs $99.95 in OEM quantities from the firm at P.O. Box 33, Marina del Rey, Calif. 90291.

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CI Notes

IBM Settles MTI Suit

ARMONK, N.Y. IBM appears to be picking up speed in eliminating the antitrust suits pending against it with the recent settlement of an action filed by Memory Technology Inc. (MTI).

The suit, filed in Boston in 1974, sought damages of $56 million and asked for trebled damages, or $168 million.

IBM agreed to pay $50,000 to the trustee for MTI, which filed for bankruptcy, and MTI in turn has withdrawn its suit with prejudice. The MTI suit was consolidated for pretrial purposes with six other antitrust suits in California.

Singer Selling Foreign SBM to ICL

NEW YORK International Computers Ltd. (ICL) has stepped forth as the prospective buyer for Singer Co.'s international operations of the Singer Business Machines (SBM) division.

The agreement in principle calls for ICL to assume management responsibilities April 1, with full integration expected by the end of the year, according to Singer.

The agreement was based on payment of an undisclosed amount of cash. ICL is understood to have made a $2 million deposit.

Singer recently announced TRW would take over management responsibilities for its North American base of System Tens and point-of-sale equipment [CW, March 22].

SBM will continue to market SBM products while ICL decides which SBM products will become a permanent part of its portfolio, a Singer spokesman said.

The foreign base of SBM products is comprised largely of the 1500 intelligent terminal line, but also includes the System Ten, he explained.

ICL will take over a software facility in Brussels but no manufacturing facilities, he added. The British firm has indicated it will retain as many SBM personnel as it can, he said.

Last year, Singer's international perations in the SBM had sales of $137 million, Singer said

STC Puts 6,250 Bit/In. Units in IRS

LOUISVILLE, Colo. Storage Technology Corp. (STC) will realize $7.1 million in revenues from the sale of its 6,250 bit/in. tape drives to the Internal Revenue Service (IRS) and Southwestern Bell Telephone Co.

The firm is upgrading existing 1,600 bit/in. equipment at the IRS for a net value of about $4 million.

STC said $2.1 million in sales was recorded during the 1975 fourth quarter and the remaining $5 million will be recorded in the first quarter of 1976.

Makers' Approaches Vary

Minis Quicken Pace in Business DP Area

By Molly Upton
Of the CW Staff

With market projections for the business market as rosy as ever, mini makers are showing increased interest in either getting into the market or stepping up their activity.

Modular Computer Systems, Inc. (Modcomp) has announced an agreement in principle to acquire ECS Information Systems, Inc., a software house, as a means of entry into the small business market.

Interdata Corp. will be introducing more packaged versions of equipment geared to specific applications areas.

And Wang Laboratories, Inc. has broadened the scope of its product line with the introduction of its Portable Computer Series (PCS) and workstations that extend the capabilities of its WCS-30.

New Entrant

Modcomp, whose primary market has been in the measurement control and automation sector, became a new entrant in the business sector through its acquisition of ECS. ECS has programmed and installed over 300 small business systems.

"The acquisition of ECS enables us to immediately enter the extremely lucrative minicomputer-based business turnkey marketplace," according to Kenneth G. Harple, Modcomp president.

"We feel that to ensure success in that market, the systems supplier must have an intimate knowledge of the specific problems and requirements of very well-defined vertical market areas," he said.

A subsidiary, Modular Business Systems, Inc., will be formed, and the firm will target vertical marketplaces with ECS handling the sales aspect. Service will be provided by Modcomp.

Sales efforts initially will be focused in the Northeast.

Steve Clayman, ECS vice-president of marketing, said that firm plans to significantly expand its sales force to handle marketing of the Modcomp Business Systems line. He anticipates a sales force of 60 to 80 people within a couple of years.

The four market areas selected for immediate penetration include industrial distributors; transportation aftermarket, or parts distributors and wholesalers, equipment suppliers and distributors, and machinery manufacturers, according to John H. Crawford, ECS president.

"We foresee the number of vertical markets in which we offer total solutions to the business DP problems increasing to more than 20 over the next three to four years," he said.

The initial ECS product line will consist of three models built around the Modcomp II family. Each will be sold on a turnkey basis with full application support, Crawford said.

In addition, Modcomp's Max III operating system has been enhanced with a data base management system, DBMS 200, and teleprocessing capabilities, he said.

Modcomp will continue to write all the systems software, he added.

The terms of the agreement call for an exchange of stock. ECS management will remain unchanged, according to Harple, and the firm will continue to be based in Lexington, Mass. Modcomp is in Fort Lauderdale, Fla.

Orientation Expanding

Interdata Corp. is expanding its orientation to the end-user market and is preparing a number of systems aimed at vertical markets, according to John W. Schneider, vice-president of marketing.

The firm is moving toward these packaged systems, he said, because it is growing and looking to procure a larger percentage of the end-user market. It also sees this as a means of [illegible] utilizing its increasing trend toward vertical integration, he added.

The Interdata approach will not include detailed applications software but rather will include specific pieces of hardware and operating systems, he said.

"We've primarily been a company that sold hardware and software products as pieces. As we start to develop more and more sophisticated pieces, especially of software and hardware, notably communications, we'll package them and offer them to customers as systems that are ready to go to specific market areas," he said.

"What we're sort of doing is preempting the customer's needs" by figuring out what "we think the most useful form of machine is for the customer" in terms of the size of the operation system, memory and compilers, he added.

The firm currently offers two packages, principally for program developers. When Schneider assumed the job, he said, the firm ran inventory to forecast

(Continued on Page 36)

Adapso '75 Salary Survey Shows Top Pay in Various U.S. Regions

By a CW Staff Writer

MONTVALE, N.J. No one region of the country has service firms with consistently better salaries than any other, although there are differences depending on position, according to the 1975 Annual Wage and Salary Survey by the Association of Data Processing Service Organizations (Adapso).

Out of five randomly chosen categories, service firms in the West and South outranked the other regions in salaries for two types of jobs, the survey found.

Firms located in the North Central area trailed in each of the five categories, while the Northeast led in one — vice-president, manager or supervisor of systems analysts and programmers.

In the Northeast, that position averaged $500.47 weekly, while the North Central region's pay averaged $415.07, the lowest of any region, according to the survey.

Service firms in the West tend to pay the most for positions of supervisors or managers of computer room and shift supervisors or senior operations, Adapso reported. These positions received average weekly salaries of $326.17 and $262.96 respectively.

The South led in average payments to senior systems analysts ($422.74) and to programmer/systems analysts, upper half, with $345.52.

In the 1975 survey of 300 firms, Adapso combined the categories of systems analysts and programmers.

Selecting those titles that were the same as those in the 1974 survey, average salaries of all service companies rose anywhere from 8% to 16% last year.

The project manager lead programmer grabbed the 16% raise, jumping to $359.39 from $300.73 weekly in 1974.

The vice-president, manager or supervisor of systems analysts' average paycheck grew 12% to $436.67 compared with $382.50 per week in 1974.

Supervisors or managers of computer rooms averaged an 8% increase to $295.17 weekly compared with $271.29 in 1974.

These figures were for salaries of all service companies, Adapso said. The study also broke out salaries for time-sharing and software firms.

Time-sharing firms tended to pay more for both the top supervisor of computer operations and for the supervisor of systems analysts compared with software firms.

The computer room supervisor or manager received an average of $333.25

(Continued on Page 36)

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Small Business Mart Scene of Activity For Makers of Minis

(Continued from Page 35)

As it started to build typical sysems around what customers were using, it then decided to market these.

By knowing what the customers wanted, he said, the firm could forecast and build to inventory and have the systems available off the shelf.

Wang Laboratories, Inc. broadened its line with a portable unit selling for $5,400 and a multiprocessor system with two workstations, a 5M-byte disk, 200 char./sec priner, floppy disk, CRT and disk multiplexer selling for $41,000.

Since its introduction last April, Wang has installed about 1,700 WCS systems valued at about $40 million, according to John Cunningham, senior vice-president.

More than 8,000 of its 2200-based systems are installed, he added.

With the addition of the workstation unit, Wang expects to penetrate the distributed processing market, he said.

It also unveiled a Management Planning System package for financial planners which will operate on a system with a 2200 CPU, tape cassette, keyboard, CRT and 120 char./sec printer for $13,300.

A turnkey system called Wang/Cash, priced at $25,300, includes a 2200 CPU, a CRT and modified keyboard, dual diskette and a 200 char./sec printer. The system includes nine programs developed by Basic Business Systems, Inc.

Survey Covers Wages At Service Bureaus

(Continued from Page 35)

weekly in 1975, an 18% jump over the $270.18 in 1974; at software firms, this position averaged $313.17.

The pay was also tops at time-sharing firms for the vice-president, manager or supervisor of systems analysts, with $490.88, whereas this position averaged $468.55 at software firms.

However, the project manager/lead programmer received top dollar at software firms – $392.03 weekly compared with $386.96 from time-sharing firms.

Salaries for some positions were not necessarily higher in firms located in larger cities, Adapso noted. For example, a shift or senior operator made $216.06 weekly in firms located in cities with under 50,000 people but only $209.46 in cities of 50,000 to 500,000.

This was also true of supervisors of systems analysts, who averaged $483.44 in the smaller cities and $421.60 in those with 50,000 to 500,000 people.

In terms of benefits, 72% of the 25 time-sharing firms answering the question reported having an employee tuition refund plan.

The survey is available for $25 from Adapso at 210 Summit Ave., Montvale, N.J. 07645.

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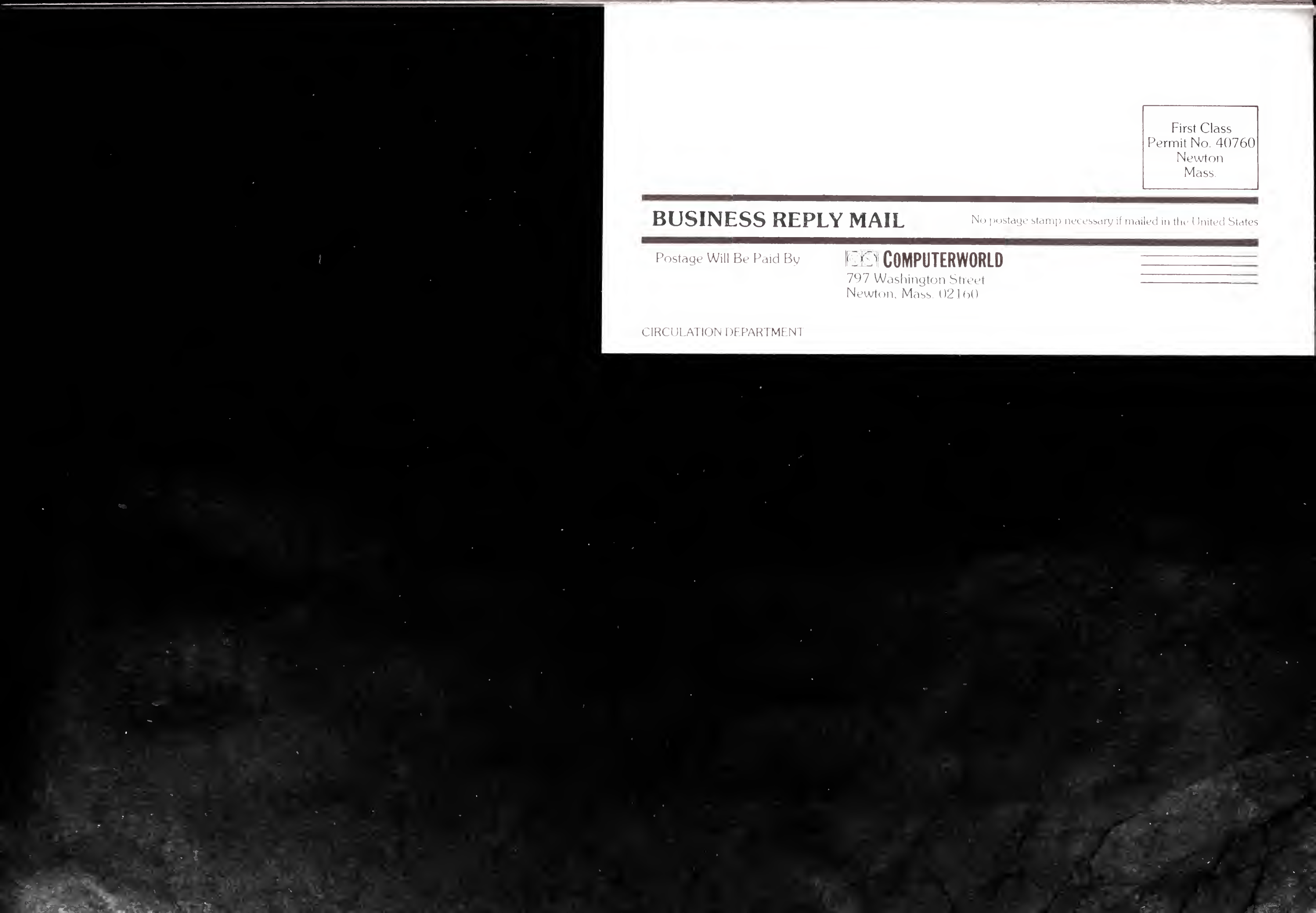

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Vendors See Need to Keep Pace With Changing Needs of Users

By Nancy French

Of the CW Staff

WASHINGTON, D.C. – As businesses change and grow, their data processing functions change also, and vendors must offer new and diversified products to meet those needs, according to vendors interviewed at the Computer Caravan here recently.

"Data entry is the last labor-intensive market in computer processing, so if you can eliminate work here, you can really save the user money," according to George Siebert, regional manager at Consolidated Computer International, Inc.

The market is becoming more sophisticated, and equipment that permits editing and verification at the source is what users are looking for today, he said.

Consolidated Computer is offering data entry systems designed particularly for the end user with long complex forms to enter, validate and verify, he said.

The product line includes a programmable 32K CPU with a 1.4M- char. disk that can be interfaced with any tape drive or variety of line printer for use in a remote location, he said.

Larry Conner, a salesman for Sycor, Inc., said Sycor is also emphasizing terminals for users in remote sites who want to enter sales orders or collect other data and validate it before it is processed in the home office.

Although Sycor started the cassette trend in the 60s, he said the flexible disk is now its principal storage medium.

Gino Toigo, federal sales manager for Lockheed Electronics, Inc., said Lockheed is attempting to fill the needs of the new user – one interested in a turnkey system.

"This user is looking for simplicity, credibility and stability – a manufacturer that knows what it's doing in the business," he said.

Tandem Computers, Inc. is offering a new computer this year for the user who needs a "fail-safe" system.

CW Photos by N. French

George Siebert

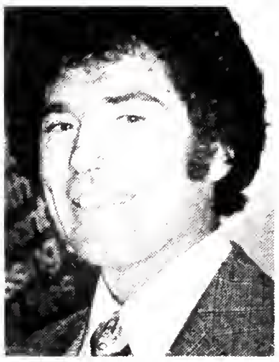
"If a hotel's computer goes down at checkout time, it could lose thousands of dollars in revenue," President Jim Treybig explained.

On the multiprocessor Tandem system, a user's application can run continuously even though a part of the system may go down, Treybig said.

The system consists of at least two processors connected by a dynabus, a terminal controller with multiple terminals and a disk controller and disk.

Delta Data Systems is also responding to users' needs for more intelligence in terminals with a user-programmable model, the 4500, with 16K read/write memory, read-only memory (ROM) or programmable read-only memory (Prom), according to Bettyann Director, customer applications engineer.

Director


Conner

Treybig

The terminal can be used for a variety of functions, she said.

The 4500 would be appropriate for the systems analyst who can write code on the terminal in Assembly language to program the simpler 4000 series, Director added.

Henry Firey, account manager for General Automation, Inc. (GA), said GA is responding to the interest in distributed processing.

GA's products are designed to assist three major types of users, including those who need to maintain a network with multiple computer sites, he said.

The second type needs stand-alone/data management systems which GA sells on a turnkey basis through distributors and systems houses, and the third type is users who need the systems for industrial and process control.

Telefile Computer Products, known for its Xerox-compatible add-on memory and peripherals, is showing a disk controller that permits many mini computer users to interface with various types of disk subsystems.

Alan Kiehn, Telefile's director of engineering, said processors demand for the controller is growing from turnkey houses building customized systems, Kiehn said.

Telefile's OEM business is now about 30% of its total volume, he estimated.

As for the media manufacturers, Tim O'Gorman, Wabash vice-president of marketing, said the industry is going through a monumental change in that tape users are moving to the data module and the flexible disk.

"While tape is still our largest selling product, flexible disk is the fastest growing portion of our business, and a lot of R&D is going into it, O'Gorman said.

The change has caused somewhat of a marketing distribution dilemma, he explained, because in the past, most of Wabash's tape customers were larger users who could be serviced with a relatively small sales force.

"Now most of our customers are smaller users who buy in smaller quantities, increasing the need for salesmen and thus increasing the cost of sales," he said.

Now that computer tape use is growing at a slower rate, the only way to continue to grow is to take business away from the competition, he said.

From the Memorex booth, James McGrave, a sales representative in the Baltimore area, explained that Memorex is now providing its Data Mark 70, the Memorex version of IBM's 3340 data module, at a 15% per month lower cost than IBM, and about 4,000 Memorex modules have been installed, he said.

Tim O'Gorman

Memorex, unlike IBM, keeps costs constant for the user by providing free maintenance for three years as part of its lease and purchase price, he said.

"There's a strong user interest in our premium tape product, too," McGrave added.

Financial People Invited To Wema Spring Conference

PALO ALTO, Calif. – The Western Electronics Manufacturers Association (Wema) will hold a spring conference to bring together members of the financial community with executives of privately held and small publicly traded firms.

The conference will resemble the Wema fall gathering, but the emphasis will be on smaller firms in a growth position, a spokesman said.

Some of the DP-related firms participating in the Wema conference are Digital Development Corp., Hydra Corp., Information Terminals, Inc., Quantor Corp., Shugart Associates and Vadic Corp.

The list of more than 27 firms also includes Beehive Medical Electronics, Inc. and Monolithic Memories, Inc.

The conference will be at the Royal Inn in Monterey, Calif., April 21-23. Details are available from Wema Management Programs at 2600 El Camino Real, Palo Alto, Calif. 94306.

JSI Division to Provide Performance Evaluation

McLEAN, Va. – Johnson Systems, Inc. (JSI) has formed a performance evaluation division to provide operating system conversions, performance measurement and evaluation, real-time system optimization and application program optimization.

Data 100 Plans to Sell Terminal Systems to LFC

MINNEAPOLIS – Data 100 Corp. plans to sell up to $10 million of its computer terminal systems to Lease Financing Corp. (LFC) in Philadelphia under a nonrecourse third-party agreement.

Data 100 will account for the transactions as sales, a spokesman said. After LFC has recovered its purchase price and specified fees, the two companies will share equally all lease or sale proceeds, he said.

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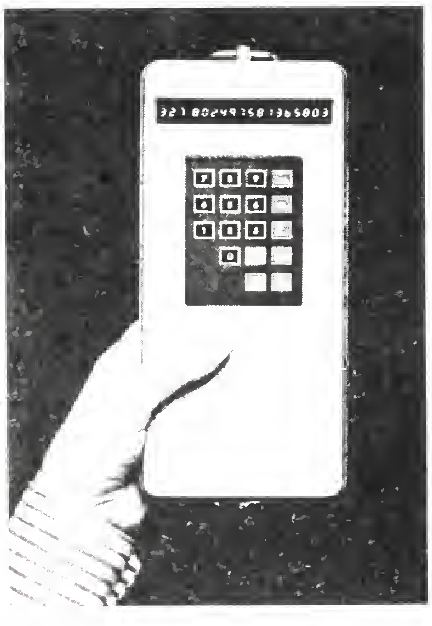

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HP Sees IBM as Mini Mart Competitor

By Molly Upton
Of the CW Staff

CUPERTINO, Calif. – IBM should be considered among those firms in the minicomputer business, according to Paul Ely Jr., general manager of Hewlett-Packard Co.'s (HP) Computer Systems Group.

If IBM's 3, System 32 and 5100 are included in the mini category along with the 7 system, then the ranking of minicomputer makers in terms of revenues is IBM, Digital Equipment Corp. and HP, respectively, he said.

Some surveys, he commented, consider only IBM's 7 in the mini category and thus rank the firm third or fourth.

For every IBM model there is a counterpart HP model, he said. The 3 fits with the HP 3000 and the 32 fits at the high end of HP's desk-top calculator and low end of its 21MX line, while the 7 is a direct competitor of the 9600.

HP's 9830 calculator parallels the IBM 5100, he said.

HP never set out to compete with IBM, Ely remarked, but there does seem to be an increasing overlap between the firm's lines.

Competing with IBM can be either a threat or an opportunity, Ely said. It would be a real threat if one was in a stable, low-growth market, he explained.

Whose Ballpark?

However, the mini marketplace is dynamic and user loyalties to IBM are not as strong as they are in the larger systems area, Ely said.

And, since there are some areas in which IBM is not particularly strong, he said he doesn't see the IBM presence as a threat.

In addition, he said, DEC and HP together are almost equal to IBM's General Systems Division in size, and if they were to happen to have common tactics it might require IBM to follow suit.

"It's not at all clear whose ballpark we're playing in," he said.

For instance, mini makers have a habit of emphasizing the rate of product introductions giving the most performance for the money, since they are not impeded by a large rental base, he said.

DP Earnings on Rise

Although HP declines to break out earnings from its computer and calculator product lines, Ely explained the relative decrease in contributions to earnings from the firm's data products in 1975 compared with 1974 stemmed from decreasing profit margins in the calculator business.

The computer earnings have been increasing and the growth rate is climbing to the point where the computer and calculator segments are almost in equilibrium, he said.

In 1974, data products had an extremely strong performance, contributing $75 million to corporate pretax earnings of $144.3 million. In 1975, DP dropped to $51 million of $148.6 million in corporate pretax earnings.

Over the next four or five years, Ely estimated the mini industry should grow at an average of 30% per year. HP will achieve that average "if we do pretty well," he commented.

How HP does depends on its product position, among other factors, he said.

During 1976, the growth average for the industry could climb to 50%, he said, adding there are signs this year will be substantially better than last year.

During 1975, the computer products showing the most rapid growth was the HP 3000, he said. The disk computer in the 2100 line grew very well, faster than the market average, he said.

While the OEM portion of HP's mini business was generally flat, there was some growth in orders for the disk computer, he said.

OEM orders have picked up, he added.

HP would like to offer a product in the DEC LSI/11 price range when it can achieve the performance of a 21MX for the same price, he said.

CW Photo by M. Upton

Paul Ely Jr.

Although Ely conceded the market for lower cost, lower performance minis is good, HP hasn't participated in that arena before and "doesn't have anything to protect," he said.

"I'm not sure we're the right people to be in there," he commented.

If HP were to enter the arena, it would be with a very different product, similar to what HP did in the hand-held calculator area, he said.

The minicomputer business is a good fit for HP's style of operation, he observed, since the business requires extensive R&D, rapid evolution of products, customer training and creating markets with the products.

Born to Consult, Mathematica Now Actively Marketing DBMS

By Esther Surden
Of the CW Staff

PRINCETON, N.J. – Mathematica, Inc. is now actively marketing its Ramis data base management system (DBMS), according to Mark Berkowitz, vice-president of the firm's Mathematica Products Group.

As a consulting firm, Mathematica always took a "very passive approach and stayed in the background," he said. The Ramis package, developed in 1968 as part of a Mathematica consulting project, has been on the market since 1970, he added.

However, as of Jan. 1, the Mathematica Product Group was chartered to develop and market products for industry, Berkowitz said.

New products that will come out of the division will be Ramis-related and decisions will be made in the near future on what direction the company should take regarding hardware, he said.

IBM Mainframes Only

Presently Ramis can only be used in IBM 360/370 environments, he noted, but the firm is considering writing the package for minis.

The firm decided to actively market its products because, Berkowitz said, "we feel products are a lot more stable and a lot more profitable than consulting."

Consulting, is, however, less competitive than marketing products, he added.

The main marketing thrust with Ramis will center around the product's track record. Over 400 companies are using the package, he noted.

Most firms find it hard to define what they want in a DBMS, everyone defines "data base" differently, Berkowitz continued.

"No data base vendor has a significant share of the market," he said.

Data Independence Claimed

The firm is trying to market the Ramis system across industry lines, claiming the package is data-independent. Presently Ramis is in use in utilities, banking and petroleum industries, Berkowitz said.

"Our aim is to move out of the report writer and information retrieval classifications and to get people to recognize us as a DBMS vendor," Berkowitz continued.

The firm has Ramis sales offices in Princeton, N.J., Los Angeles and London, he added, and purchase of the package includes installation and 10 free days of consultant time to help the user implement his first application or for training.

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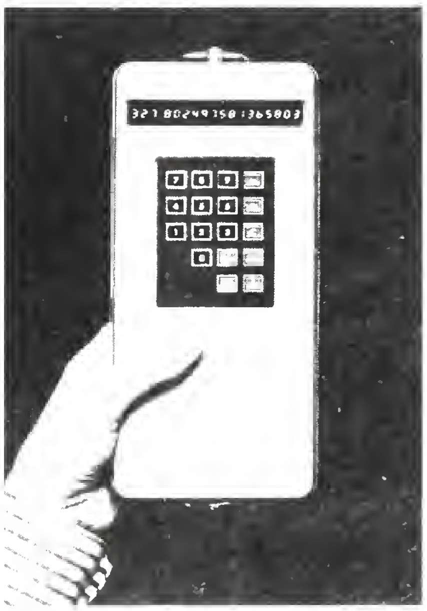

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Back From Brink of Bankruptcy

MAI Head Says Focus on Expansion of Subsidiaries

NEW YORK "Right now Management Assistance, Inc (MAI) is concentrating on expanding the scope of its subsidiaries Genesis One Computer Corp. is marketing a plug-to-plug compatible CRT terminal.

"Sorbus, Inc is expanding its coverage and is signing service agreements with major computer equipment manufacturers.

"Basic/Four Corp is opening new offices of its own as well as expanding its distributor network Overseas, MAI International sells in 27 countries, either directly or through distributorships."

Not a bad scenario for a firm which MAI President Raymond P Kurshan said was on the brink of filing a bankruptcy petition four years ago.

An end-user-oriented computer company, MAI has come a long way since 1970, when Kurshan took over as president, he said

At that time MAI faced a debt load in excess of $140 million, shareholders' equity in deficit by $28 million, steadily mounting operational losses that were to continue until 1973 and over $42 million worth of off-lease inventory of obsolete IBM unit record equipment.

Today the senior debt load has been reduced to about $13.3 million through internally generated funds, shareowner equity stands at $5.9 million and profitability is improving steadily, based on operations of subsidiaries which did not exist in 1969.

Further, equipment leasing the primary cause of the company's problems is now down to 26% from 92% of the volume in 1970.

The road back to financial respectability and health was a rocky one. "Negative cash flow, insolvency and meeting debt service obligations were our major problems," according to Kurshan.

On the way to recovery, $33 million of outdated inventory was written off; a $15 million residual value account was set up and realized two years ahead of schedule; a recapitalization program consummated; a new business computer system was developed specifically for a market few thought viable; and one of the largest independent computer maintenance service organizations in the industry was created. Kurshan said.

From 1960 to 1966 Kurshan arranged for and the company used up more than $175 million in lines of credit. An additional $58 million in equity capital was raised.

Then, to discourage the growth of third-party leasing, IBM discontinued the practice of discounting the purchase price of used equipment, eroding MAI's profitability, which was already suffering from competition.

The most serious blows, however, came with the rapid-fire introduction of new generations of computer equipment, rendering the old equipment obsolete much faster than had been anticipated.

In 1969 the company had a negative cash flow. Between fiscal 1968 and 1970, MAI reevaluated its inventory of domestically owned equipment, resulting in a $42-million write-off and throwing MAI's 1970 shareholders' equity in deficit by $28.2 million.

To stem the losses that started in 1967, MAI looked around for sources of revenue other than leasing. In the process the company began marketing under its own label and servicing peripheral equipment such as tape and disk drives manufactured by a nonaffiliated source.

While this activity neither eradicated nor stemmed the red ink, it did gain time.

Before going to the creditors, however, the pressure of the obsolete inventory was eased by adjusting the book value of the equipment. In 1970 a $15-million residual value account was established – the estimated recoverable net value of the company's domestic portfolio of off-rent equipment – to be realized over the next five years.

In 1971 Kurshan negotiated recapitalization, by which over $44 million of debt was converted to equity, others were rescheduled and payments and interest on certain of the indebtedness were waived.

The plan as implemented involved more than $90 million of debt and gave MAI a positive shareholders' equity.

More importantly, it bought time to develop a small, self-contained DP system for what was then an untapped market – the small business market.

MAI established Basic/Four Corp. as a subsidiary to develop and market a simple-to-operate and easy-to-program computer system for the "first-time" small business user.

Through aggressive selling efforts, some 1,100 Basic/Four systems were installed and put into operation in three years. Sales of Basic/Four systems in 1974 exceeded $30 million, producing profits in excess of $1.1 million.

At the same time, the company expanded the services of its third-party maintenance subsidiary, Sorbus. Previously it had serviced only equipment that the company marketed.

In 1974 this subsidiary produced a volume of $20 million, accounting for 26.4% of MAI's total volume.

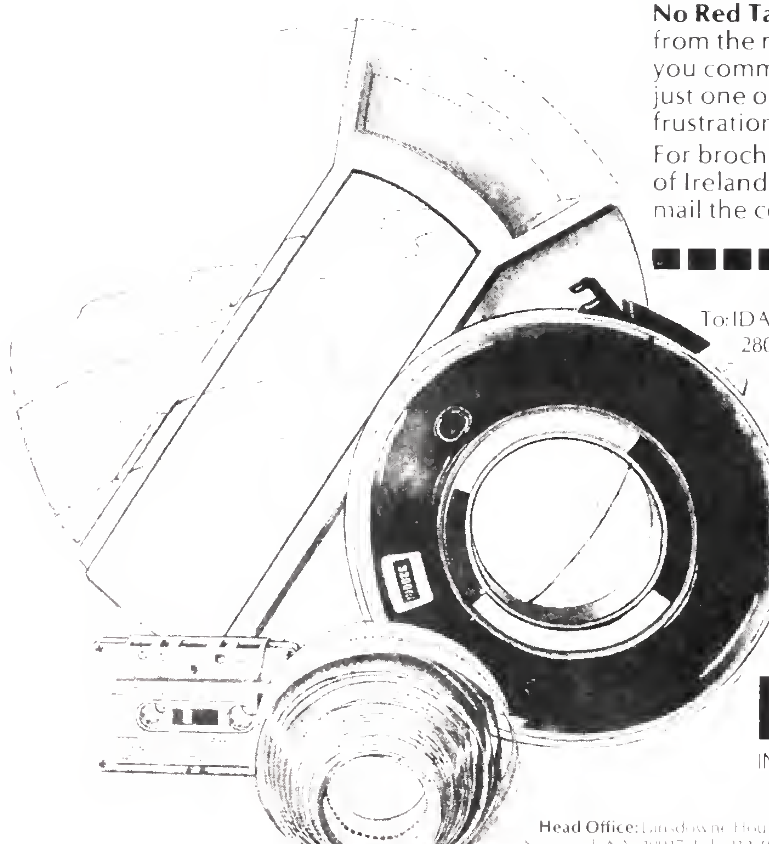
Genesis One Generates Cash

Between the 1971 recapitalization and August 1974, MAI reduced its debt to major creditors to $16.3 million – through its own resources, out of cash generated by a single subsidiary, Genesis One, the company's marketing arm.

Even though MAI in four years reduced its debt by more than 80%, opened new computer markets and introduced new marketing and service concepts, its problems were far from over, Kurshan said.

MAI negotiated a second recapitalization plan, scaling down the mandatory debt payments from $1.3 million/mo to $200,000/mo starting in October 1974, and issuing a new Series C preferred stock.

With the most pressing financial problems now behind him, Kurshan is devoting his time to planning the company's future, he said.



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Wyly Giving Swiss Firm 45% of Company Common

DALLAS – A plan giving 45% of the common stock of Wyly Corp. to Walter Haefner Holding AG of Zurich, Switzerland, has been approved by the board of directors of the Texas firm in a recapitalization move.

The stock will be nonvoting in order to satisfy requirements of the Federal Communications Commission (FCC) that bar foreign control of common carriers. Such a large block of nonvoting stock, however, could cause Wyly to lose its listing on the New York Stock Exchange.

Upon completion of the plan, Wyly's consolidated debt will be reduced by $70 million. Shareholders' equity will rise by $62 million and its annual debt service interest payment will drop by $1.8 million, the firm said.

Under the terms of the plan, Haefner will convert about $46 million of Wyly notes and debentures into a new nonvoting class of common and forfeit rights securing the $46 million debt that are senior to outstanding public debt.

The plan calls for 90% of the holders of Wyly 7.25% debentures and 4% capital notes to exchange their debt for a new 6% convertible debenture and Wyly common.

Chairman Sam Wyly said the plan will simplify the firm's capital structure and facilitate the procurement of additional financing for its Data Transmission Co. (Datran) subsidiary.

"When this is done, Data Transmission will have sources of financing other than Haefner," Wyly said.

Completion of the plan will result in Haefner owning about 45% of the total of all classes of Wyly common and about 61% of all Datran stock. Wyly will retain about 80% of Datran common.

Wyly said Haefner's interest is purely investment and that Haefner will not seek representation on the board of directors.

The stock Haefner gains in Datran is nonvoting while owned by non-U.S. citizens. The new stock will be entitled to vote as a class on certain transactions involving the acquisition or sale of a substantial portion of Datran assets or sale of additional Datran common and other "material mergers" involving Wyly or its subsidiaries, Wyly said.

The plan requires approval by a majority of Wyly shareholders, excluding Wyly family members and Haefner, as well as by the FCC and acceptance by at least 90% of Wyly bondholders.

Engineering Staffs Seen Making Top-Level Decisions Too Often

COSTA MESA, Calif. – Engineering personnel are inadvertently preempting or usurping from corporate officials too many decisions which properly should be made at the highest executive levels, according to Robert Lowery, board chairman of Technology Marketing, Inc.

"This is especially true for OEMs in such fields as electronics and computers who want to add or upgrade the automation functions in systems they produce," he said.

"Whether or not the staff engineering people are computer specialists, they often make critical decisions which have a significant business impact on the availability and competitiveness of the company's new end product.

"Too often, top company managers fail to recognize the possible disastrous consequences resulting from what appears to be a design decision," Lowry stated.

Advantages Unrecognized

Even after prototypes are built, neither the designers nor management may recognize the advantages which could have been gained by using a different approach unless a full technical, performance and cost analysis with goals and objectives has been prepared in advance and presented for a management decision, Lowry stressed.

"Since the computer alternatives and trade-offs are complex, nontechnical executives tend to relegate the decision-making function to the staff engineers, often without even realizing the implications," he explained.

That can extract penalties in loss of market position and profitability. "No line executive would relinquish his control over those fundamentals willingly, but many are doing so unknowingly," Lowry said.

"For a given application there can be a number of different approaches at both the system and implementation levels which might be worthy of management consideration.

"The advantages and limitations of each must be compared by specialists, but the final decisions have to be made by management executives, based on a full understanding of the impact on corporate objectives," he stated.

A wrong decision can result in the end equipment requiring far more software or memory than was originally anticipated adversely affecting the final product and selling price – or could mean the throughput is constricted, limiting the performance of the system, according to Lowry.

Three-Step Procedure

To avoid such mistakes, Lowry recommended a three-step approach for corporate executives:

- When a new product or development is under consideration, those objectives having the greatest marketing and cost impact should be isolated.
- A cost/performance analysis of each possible approach to meeting the corporate objectives should be prepared.
- Third, a corporate executive no lower than the division vice-president level "must bite the bullet and become involved in the decisions and trade-offs himself," Lowry emphasized.

"You can't make the problem go away by continuing to let it slip unnoticed out of the executive suite. That just increases the risk of unexpected problems," Lowry concluded.

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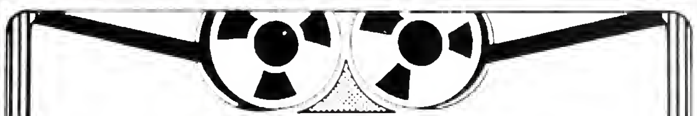

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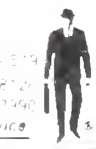

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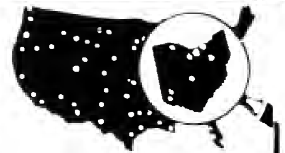

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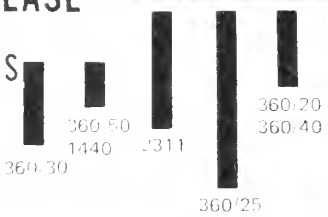

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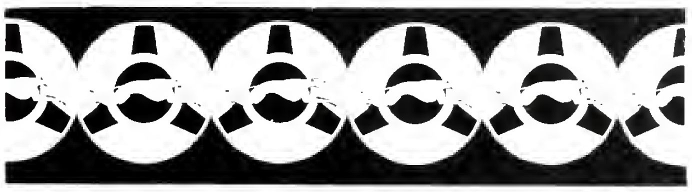

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MDS Nine-Month Net in Plus Column

PARSIPPANY, N.Y. – Mohawk Data Sciences Corp. (MDS) posted earnings of $3.6 million or 53 cents a share for the nine months ended Jan. 31 compared with a loss of $14.5 million or $2.32 a share in the same period last year.

About $5 million of last year's loss reflected discontinued operations and an accounting change.

[redacted]

Control, 2001 Capital Avenue, Emerson Building, Cheyenne, Wyoming 82002. Phone (307) 777-7253.

MDS attributed the decrease in revenues principally to the planned withdrawal from certain OEM product lines and the effects of a stronger U.S. dollar on translation of international revenues.

During the nine months, currency translation contributed $2.1 million to operating results: in the year-ago period, the firm incurred losses of about $1 million in this area.

Third Quarter Improved

Earnings for the third quarter improved to nearly $1.2 million or 17 cents a share compared with a loss of $4 million or 64 cents a share in the year-ago quarter.

Quarter revenues dropped slightly to $40 million from almost $42.4 million a year ago.

Currency translation gains during the quarter totaled $330,000 compared with a loss of $2.2 million in the same period last year.

"The company's program to reduce manufacturing and other operating costs, strengthening of the dollar as against foreign currency and a sizable reduction in interest expense have contributed to the improvement in MDS' earnings," President Ralph H. O'Brien said.

Debt Reduced

MDS' bank debt was reduced by $32.5 million to $69.3 million by Jan. 31 during the nine-month period.

"This reduction in bank debt largely accounts for our decreased interest expense, which is about 32% less than last year. We currently have in excess of $28 million of unused commitments under our revolving credit agreement with no present plans to utilize this availability," O'Brien stated.

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EMM Ends Year in the Red

[redacted] Memories & Magnetics Corp.
ning revenues in both the year
7.
.2 or 61 cents a share compared
million or 72 cents a share,
it of $1.9 million, in 1974.
$93 million compared with

amounted to $552,000 or 15
loss of $253,000 or 10 cents a

hs decreased to $22.1 million
the year-ago quarter.
esult of sharp contractions in
npany's products which were
on, particularly during the first
s well as a four-week strike
t product plants, according to
ard.
npanied by shifts in product
ion, resulted in a deterioration
s, producing an operating loss
for 1975," he said.

Data 100 Dips in Quarter, Rises in Year

MINNEAPOLIS – Data 100 Corp.'s earnings rose for the year, but declined in the quarter ended Dec. 31.

For the year, earnings climbed to almost $5.7 million or $1.42 a share compared with $4.8 million or $1.40 a share last year. Tax credits were $1.5 million in 1975 and $1.8 million in 1974.

Revenues rose 38% to $95.9 million compared with $69.7 million last year.

Earnings in the last quarter decreased to $854,000 or 24 cents a share compared with about $1.6 million or 50 cents a share in the year-ago period.

An extraordinary charge of $587,000 for reduction in the effective annual tax rate caused the decline in earnings. In the 1974 period, there was a $452,000 tax credit.

Revenues for the quarter rose 29% to almost $27.9 million compared with $21.6 million a year ago.

Identicon Reduces Nine-Month Loss, But Earnings Slip in Third Quarter

FRANKLIN, Mass. – Although Identicon Corp. reduced its losses in the nine months, it also showed reduced earnings in the third quarter ended Dec. 31.

The firm expects a loss in the final quarter as a result of lower volume, which reflects delays in receipt of some large orders currently being negotiated, according to Harvey White, president.

The loss for the nine month totaled $128,477 or 11 cents share compared with a loss o $377,141 or 34 cents a share i the year-ago period.

Revenues Up

Revenues increased to almos $1.1 million compared with $801,223 in the same nine months in 1974.

For the quarter, earnings totaled $777 compared with $1,134 in the year-ago quarter.

Revenues declined to $448,023 compared with $577,581 in the third quarter of 1974.

Cost control programs enabled the company to report a small [redacted] its marketing efforts, White said.

REI Quarter Continues Profitable

DALLAS – Both earnings and revenues increased in the first quarter of 1976 at Recognition Equipment, Inc. (REI) as the firm scored its eighth consecutive profitable quarter.

Earnings for the period ended Jan. 31 jumped to $1.5 million or 26 cents a share compared with $655,000 or 12 cents a share in the year-ago period.

Earnings included $500,000 from settlement of a lawsuit.

Revenues reached $16.6 million in the quarter compared with $10.3 million a year ago.

The purchase value of equipment shipped for lease and purchase during the first quarter totaled $9.7 million compared with $6 million in 1975.

The backlog of firm orders exclusive of development contracts for both lease and purchase of equipment on Jan. 31 was $31.3 million (purchase value), down from $35.7 million last year

GCC Revenues Up, Net Down in '75

PHOENIX – Earnings declined for the year but rose in the fourth quarter at Greyhound Computer Corp. (GCC).

In both periods the firm showed losses before tax credits were considered.

The decline in earnings for the year was primarily because of unfavorable data services results, Olie E. Swanky, GCC president, said.

GCC's inability to purchase new computer equipment for lease on favorable terms continues to adversely affect GCC's results, he added.

Lower Interest Rates

The improvement in fourth-quarter results came principally from lower short-term interest rates and the favorable effects of GCC's acquisition of Computer Leasing Co., Swanky said.

Earnings in 1975 decreased to $687,000 or 16 cents a share from $952,000 or 22 cents a share in 1974. Tax credits totaled $6.6 million and $3.2 million respectively.

Revenues increased to almost $61.4 million from $52.1 million in 1974.

Earnings in the last quarter climbed to $386,000 or 9 cents a share compared with a loss of $128,000 or 3 cents a share in the same period last year. Tax credits rose to $1.6 million compared with $872,000 a year ago.

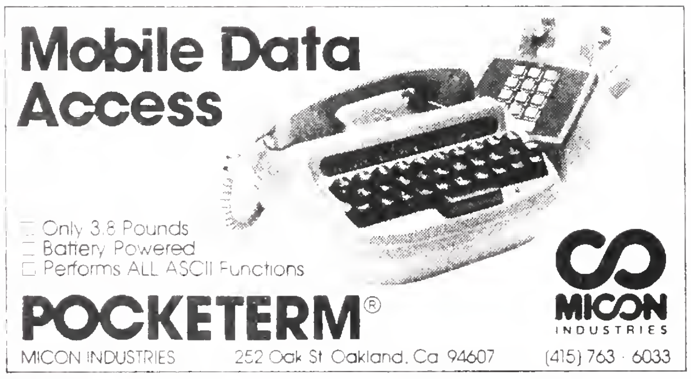
Eourth-quarter revenues rose to nearly $15 million compared with $12.4 million in the year-ago quarter.

Revenue and earnings figures for 1975 included GCC's subsidiary, Computer Leasing Co., acquired on Dec. 31, 1974.

ACT Edges Upward

NEW YORK – Advanced Computer Techniques Corp.'s (ACT) nine-month earnings edged upward to $235,000 or 20 cents a share compared with $212,000 or 18 cents a share in the same period last year.

Revenues rose to nearly $6.4 million compared with $6.1 million in the year-ago period.



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Request for Proposal No. 231 — for the lease or purchase of software to provide an interactive language support capability for an IBM 370/145 operating under DOS/VS.
Request for Proposal No. 232 — for the lease or purchase of a COBOL compiler conforming to the ANSI standards to operate on an IBM DOS/VS system.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.
Clyde P. Ballard, Executive Director
Central Data Processing Aurhority

Earnings Reports

EX-CELL-O
Year Ended Nov. 30

	a1975	1974
Shr Ernd	$2.51	$2.33
Revenue	423,545,000	387,034,000
Earnings	19,957,000	18,789,000

a-Reflects change to Lifo accounting method for additional inventories.

BARRY WRIGHT
Year Ended Dec. 31

	1975	1974
Shr Ernd	$1.16	$1.15
Revenue	42,778,941	45,986,675
Earnings	1,898,625	1,872,399
3 Mo Shr	11,761,382	12,300,506
Earnings	756,111	633,410

DIGITAL EQUIPMENT
Three Months Ended Dec. 27

	1975 (000)	1974 (000)
Shr Ernd	$1.35	$.81
Revenue	172,601	126,837
Earnings	16,274	9,763
6 Mo Shr	2.30	1.44
Revenue	313,059	238,590
Earnings	27,664	17,251

TRW
Year Ended Dec. 31

	1975 (000)	a1974 (000)
Shr Ernd	$2.86	$2.62
Revenue	2,585,700	2,486,000
Earnings	103,900	93,000
3 Mo Shr	.85	.66
Revenue	680,000	647,300
Earnings	31,300	23,500

a-Restated.

RAPIDATA
Year Ended Dec. 31

	1975	1974
Shr Ernd	$.70	$.28
Revenue	14,772,314	11,511,632
Earnings	1,278,325	514,237
3 Mo Shr	.17	.10
Revenue	3,739,478	3,127,263
Earnings	313,313	184,590

SINGER
Year Ended Dec. 31

	a1975 (000)	1974 (000)
Shr Ernd	.....	$3.25
Revenue	$2,060,454	2,102,952
Disc Op	(410,532)	(70,770)
Loss	451,853	10,113
3 Mo Shr	.....	.13
Revenue	539,881	545,601
Disc Op	(362,157)	(13,996)
Loss	414,630	10,449

a-Preliminary; reflects $371.2 million provision in the year and $345.2 million in the quarter for decision to discontinue the Business Machines Division as well as certain others.

SYSTEM ENGINEERING LABS
Three Months Ended Dec. 26

	1975	1974
Shr Ernd	$.02	.....
Revenue	5,732,706	$4,505,418
Earnings	40,519	(98,491)
6 Mo Rev	8,574,905	9,030,633
Loss	501,920	208,310

WANGCO
Three Months Ended Jan. 3

	1976	1975
Shr Ernd	$.46	$.20
Revenue	7,038,253	4,801,153
Earnings	507,668	214,092

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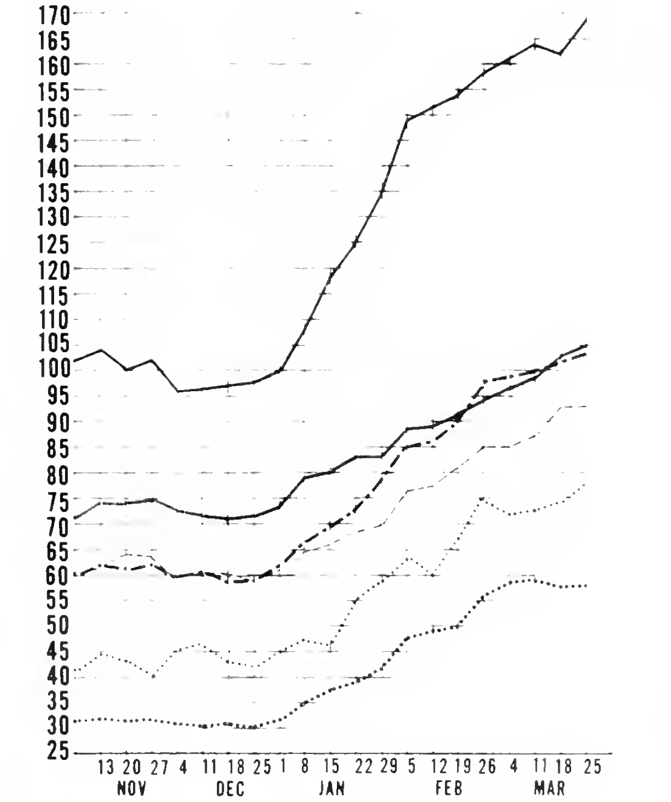

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 24, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass 02139

COMPUTER SYSTEMS

EXCH		1975-76 RANGE (1)	CLOSE MAR 24 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	101	-5 7/8	-5.4
O	COMPUTER AUTOMATION	2- 19	19	+1 1/4	+7.0
N	CONTROL DATA CORP	11- 26	25 1/2	+1 1/2	+6.2
N	DATA GENERAL CORP	10- 55	53 3/4	+3	+5.9
O	DATAPOINT CORP	6- 39	37	0	0.0
O	DIGITAL COMP CONTROL	1- 4	3 1/4	- 1/4	-7.1
N	DIGITAL EQUIPMENT	46-179	173 3/4	+1 3/4	+1.0
N	ELECTRONIC ASSOC.	2- 5	4 3/8	+ 3/8	+9.3
A	ELECTRONIC ENGINEER.	5- 16	15 1/2	+ 1/4	+1.6
N	FOXBORO	23- 42	37 1/8	+1 1/4	+3.4
O	GENERAL AUTOMATION	4- 14	10	+1 5/8	+19.4
O	GRI COMPUTER CORP	1- 1	7/8	0	0.0
N	HEWLETT-PACKARD CO	53-120	110	+3 3/4	+3.5
N	HONEYWELL INC	22- 56	48 3/4	-2 1/4	-4.4
N	IBM	158-266	261 3/4	+3 5/8	+1.4
O	MANAGEMENT ASSIST	1- 2	2 3/8	+ 1/2	+26.6
O	MEMOREX	1- 26	23 3/4	+ 3/8	+1.6
O	MICRODATA CORP	2- 23	23 1/8	+2 1/4	+10.7
O	MODULAR COMPUTER SYS	5- 19	10 3/4	+ 1/2	+4.8
N	NCR	15- 39	28 7/8	+2 1/2	+9.4
O	PRIME COMPUTER INC	2- 10	10	+ 1/4	+2.5
N	PERKIN-ELMER	16- 30	24	+1	+4.3
N	RAYTHEON CO	26- 59	51 1/2	+3	+6.1
N	SPERRY RAND	26- 49	47 5/8	+1	+2.1
O	SYCOR INC	5- 31	27 1/4	-1 1/2	-5.2
A	SYSTEMS ENG. LABS	1- 10	10 1/4	+ 3/8	+3.7
N	VARIAN ASSOCIATES	7- 18	16 1/8	+ 3/4	+4.8
N	WANG LABS.	7- 20	18	+ 1/2	+2.8

LEASING COMPANIES

EXCH		1975-76 RANGE (1)	CLOSE MAR 24 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 9	8 3/8	+ 3/8	+4.6
A	COMMERCE GROUP CORP	2- 4	3	+ 1/8	+4.3
A	COMPUTER INVSTRS GRP	1- 3	2 5/8	+1 1/8	+75.0
M	DATRONIC RENTAL	1- 1	5/8	0	0.0
A	DCL INC	0- 1	3/4	0	0.0
N	DPF INC	3- 7	5 7/8	0	0.0
O	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 5	4 1/4	- 1/8	-2.8
N	ITEL	3- 13	11 3/4	- 3/8	-3.0
N	LEASCO CORP	4- 14	12 3/8	+ 1/2	+4.2
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	0- 4	1/4	0	0.0
A	PIONEER TEK CORP	2- 9	7 3/4	+ 1/4	+3.3
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	11 1/2	+ 1/2	+4.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

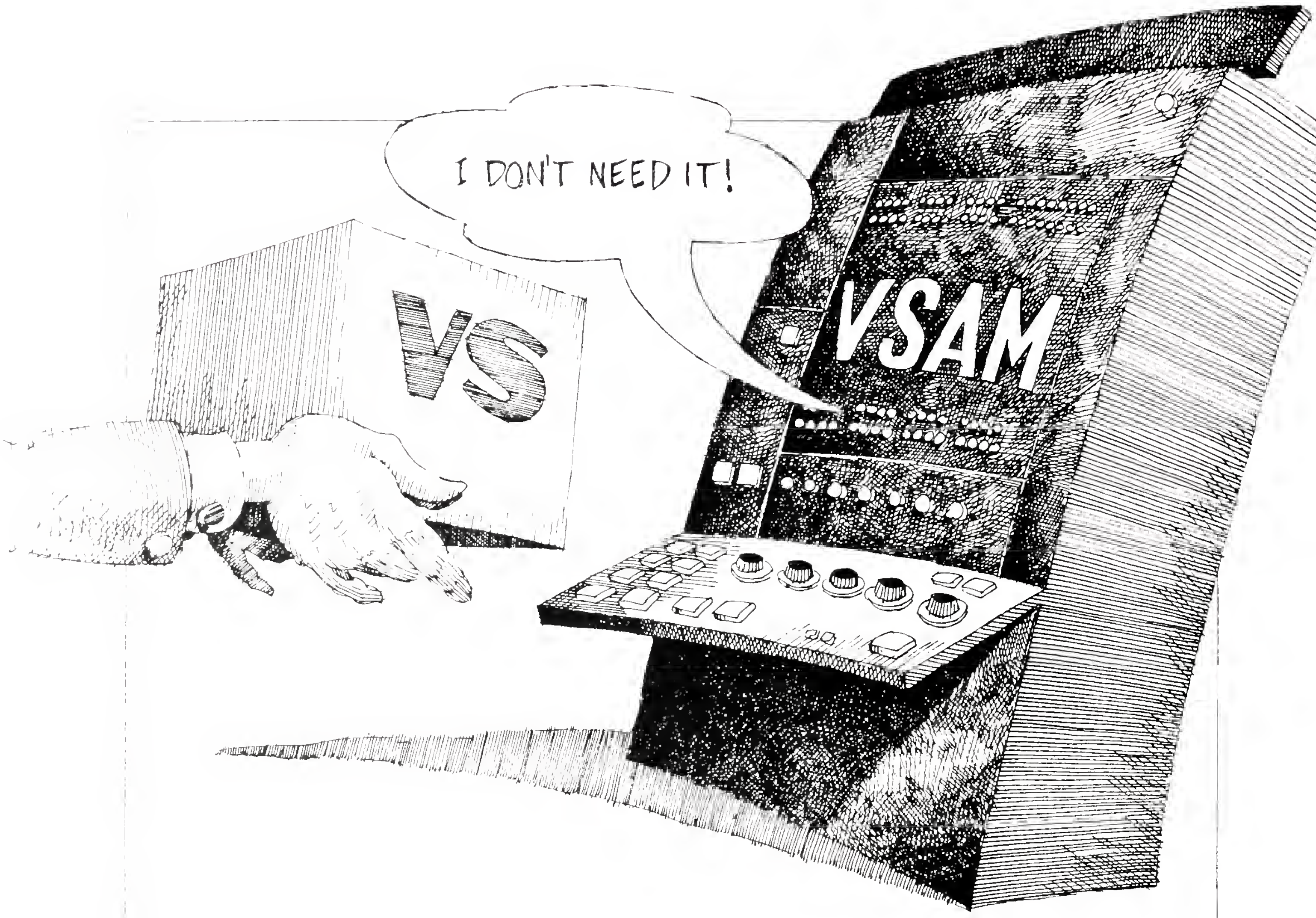
EXCH		1975-76 RANGE (1)	CLOSE MAR 24 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	3/4	0	0.0
A	APPLIED DATA RES.	1- 10	2 3/4	+ 1/8	+4.7
N	AUTOMATIC DATA PROC	29- 65	63 3/4	+3 1/4	+5.3
O	BRANDON APPLIED SYST	1- 1	1/8	- 1/8	-50.0
O	COLEMAN AMERICAN COS	4- 5	4 3/8	0	0.0
O	COMPUTER DIMENSIONS	2- 7	6 3/8	+ 5/8	+10.8
O	COMP ELECTION SYSTMS	3- 7	6	0	0.0
O	COMPUTER HORIZONS	1- 1	1 3/4	+ 1/8	+7.6
O	COMPUTER NETWORK	1- 5	3 3/4	- 1/8	-3.2
N	COMPUTER SCIENCES	2- 8	7 1/4	+ 5/8	+9.4
O	COMPUTER TASK GROUP	1- 1	1	0	0.0
O	COMPUTER USAGE	2- 6	5 1/2	- 3/8	-6.3
O	COMSHARE	2- 4	3 1/4	+ 1/4	+8.3
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	13 1/8	- 1/2	-3.6
O	INFONATIONAL INC	1- 1	1/4	+ 1/8	+100.0
O	IPS COMPUTER MARKET.	1- 1	1 1/4	- 1/4	-16.6
O	KEANE ASSOCIATES	2- 3	3	0	0.0
O	KEYDATA CORP	2- 5	3 1/2	- 1/4	-6.6
O	LOGICON	3- 5	3 7/8	- 1/4	-6.0
A	MANAGEMENT DATA	1- 3	2 5/8	- 1/4	-8.6
A	NATIONAL CSS INC	6- 25	20 1/2	0	0.0
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 22	19 1/8	- 1/4	-1.2
N	PLANNING RESEARCH	2- 5	4 1/4	+ 1/4	+6.2
O	PROGRAMMING & SYS	1- 1	1/2	- 1/8	-20.0
O	RAPIDATA INC	2- 5	4	- 1/4	-5.8
O	REYNOLDS & REYNOLDS	10- 24	18 1/2	- 1/2	-2.6
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1	0	0.0
O	TYMSHARE INC	7- 28	26 3/8	+1 1/4	+4.9
A	URS SYSTEMS	2- 5	3 7/8	- 3/8	-8.8
N	WYLY CORP	2- 7	4 1/4	-1 1/2	-26.0

PERIPHERALS & SUBSYSTEMS

EXCH		1975-76 RANGE (1)	CLOSE MAR 24 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	4- 13	10	- 3/8	-3.6
O	ADVANCED MEMORY SYS	1- 10	9	+ 5/8	+7.4
N	AMPEX CORP	3- 8	8 1/4	+ 3/8	+4.7
O	ANDERSON JACOBSON	1- 4	3	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 5	4 5/8	- 1/8	-2.6
A	BOLT,BERANEK & NEW	5- 13	8 1/2	- 1/4	-2.9
N	BUNKER-RAMO	4- 8	6 1/2	- 1/8	-1.8
A	CALCOMP	3- 7	5 1/2	0	0.0
O	CAMBRIDGE MEMORIES	1- 5	4 1/4	+ 1/8	+3.0
N	CENTRONICS DATA COMP	7- 35	28 5/8	- 7/8	-2.9
O	CODEX CORP	15- 42	38 1/2	0	0.0
O	COGNITRONICS	1- 2	1 1/4	0	0.0
O	COMPUTER COMMUN.	1- 3	4 1/8	+ 5/8	+17.8
O	COMPUTER CONSOLES	3- 7	5 1/2	+ 1/4	+4.7
A	COMPUTER EQUIPMENT	1- 3	2	- 1/8	-5.8
O	COMPUTER MACHINERY	1- 2	1 3/4	- 1/8	-6.6
O	COMPUTER TRANSCEIVER	1- 2	1 5/8	- 5/8	-27.7
O	COMTEN	2- 9	9	+ 5/8	+8.4
N	CONRAC CORP	12- 30	22 5/8	- 3/8	-1.6
O	DATA ACCESS SYSTEMS	1- 3	1 3/8	[illegible]	0.0
O	DATA 100	5- 16	12 7/8	- 3/8	-2.9
A	DATA PRODUCTS CORP	2- 11	10 1/4	+ 3/4	+8.0
O	DATA TECHNOLOGY	1- 3	2 1/8	[illegible]	0.0
O	DATUM INC	1- [illegible]	[illegible] 1/8	[illegible]	0.0
O	DECISION DATA COMPUT	2- 7	[illegible] 1/2	+ 1/4	+7.6
O	DELTA DATA SYSTEMS	1- 1	3/8	[illegible]	0.0
O	[illegible]	1- 1	1	[illegible]	0.0
N	ELECTRONIC M & M	1- 3	2 7/8	- 1/4	-8.0
O	FABRI-TEK	1- 1	1	- 1/8	-11.1
O	GENERAL COMPUTER SYS	1- [illegible]	1 1/2	+ 1/4	+[illegible]
N	HAZELTINE CORP	3- 12	[illegible] 3/8	[illegible]	-[illegible]
N	HARRIS CORP	[illegible]- 47	[illegible] 1/4	[illegible]	[illegible]
A	[illegible]	3- [illegible]	[illegible] 1/4	- 1/4	-1.3
O	INFOREX INC	[illegible]- 7	[illegible] 3/4	+ [illegible]	+14.9
O	INFORMATION [illegible]	[illegible]- 13	[illegible] 1/2	- 1/2	-2.9
O	INTEL CORP	[illegible]	[illegible] 1/2	+ [illegible] 1/2	+2.5
A	[illegible] ELECTRONICS	3- 7	[illegible] 5/8	- 1/8	-[illegible]
O	[illegible] DATA [illegible]	3- 10	7	+ [illegible]	+[illegible]
A	[illegible]	[illegible]	[illegible] 1/2	+ 1/8	+[illegible]
N	MOHAWK DATA [illegible]	1- 7	7/8	- 1/8	-[illegible]
O	OPTICAL [illegible]	1- 3	[illegible]	- 7/8	-[illegible]
O	[illegible]	1- 2	[illegible]	- 1/4	-[illegible]
A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
O	[illegible]	1- 1	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]- 5	[illegible]	+ 1/4	+[illegible]
O	[illegible]	[illegible]- 11	[illegible]	[illegible]	-[illegible]
N	[illegible]	[illegible]	[illegible]	- 1/4	-[illegible]
O	SCAN DATA	1- [illegible]	[illegible]	- 1/4	-[illegible]
O	[illegible]	[illegible]- 17	[illegible]	- [illegible]	-4.[illegible]
O	[illegible]	3- [illegible]	7 [illegible]	-1 [illegible]	-17.1
O	TALLY CORP.	1- [illegible]	[illegible]	- [illegible]	-6.3
O	[illegible]	1- [illegible]	[illegible]	[illegible]	[illegible]
N	TEKTRONIX [illegible]	[illegible]	[illegible] 1/2	[illegible] 1/2	[illegible]
N	TELEX	1- [illegible]	[illegible] 3/4	[illegible]	[illegible]
O	[illegible]	4- [illegible]	[illegible]	+[illegible]	+[illegible]
[illegible]	[illegible]	1- 4	[illegible]	[illegible]	0.0

[illegible]

EXCH		1975-76 RANGE (1)	CLOSE MAR 24 1976	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	[illegible]	1- [illegible]	[illegible]	+ 1/4	+[illegible]
O	[illegible]	4- [illegible]	[illegible]	- [illegible]	-[illegible]
A	[illegible]	[illegible]	[illegible]	+ 1/2	+[illegible]
O	[illegible]	[illegible] 1	[illegible]	+ [illegible]	+[illegible]
A	[illegible]	[illegible]	[illegible]	-1 [illegible]	-[illegible]
O	[illegible]	[illegible]- 25	[illegible]	[illegible]	-[illegible]
N	[illegible]	[illegible]- 3	[illegible]	+ [illegible]	+[illegible]
O	GRAHAM MAGNETICS	[illegible]- 13	[illegible]	- [illegible]	-[illegible]
O	GRAPHIC [illegible]	[illegible]- 21	[illegible]	-1 [illegible]	-[illegible]
N	[illegible]	[illegible]	[illegible]	+ [illegible]	+[illegible]
O	[illegible] LTD	[illegible]	[illegible]	+1	+2.1
N	[illegible] CORP	[illegible]- 22	[illegible] 3/4	- [illegible]	-[illegible]
O	STANDARD REGISTER	11- [illegible]	[illegible] 3/4	+ [illegible]	+1.3
O	TAB PRODUCTS CO	4- 8	[illegible]	[illegible]	0.0
N	[illegible]	17- 25	[illegible] 1/[illegible]	+ [illegible]	+[illegible]
O	VANIER GRAPHICS CORP	4- [illegible]	[illegible] 1/2	+ [illegible]	+1.6
A	WABASH MAGNETICS	3- [illegible]	7	+ 1/2	+7.6
N	WALLACE BUS FORMS	15- 25	[illegible] 3/8	- [illegible]	-2.7



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